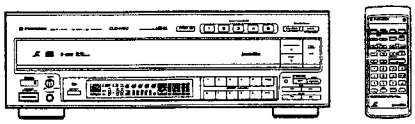
PIONEER®
The Art of Entertainment

Service Manual



ORDER NO.
ARP2306

LD CD CDV PLAYER

CLD-M90

This manual is applicable to the KUC and SD types.

- **As to the SD type, refer to page 117.**

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PIONEER ELECTRONIC CORPORATION 4-1, Meguro 1-Chome, Meguro-ku, Tokyo 153, Japan
PIONEER ELECTRONICS SERVICE INC. P.O. Box 1760, Long Beach, California 90801 U.S.A.
PIONEER ELECTRONICS OF CANADA, INC. 505 Cochrane Drive, Markham, Ontario L3R 8E3 Canada
PIONEER ELECTRONIC [EUROPE] N.V. Keetberglaan 1, 9120 Beveren, Belgium
PIONEER ELECTRONICS AUSTRALIA PTY. LTD. 178-184 Boundary Road, Braeside, Victoria 3195, Australia TEL: [03] 580-9911

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This service manual is intended for qualified service technicians; it is not meant for the casual do-it-yourselfer. Qualified technicians have the necessary test equipment and tools, and have been trained to properly and safely repair complex products such as those covered by this manual.
Improperly performed repairs can adversely affect the safety and reliability of the product and may void the warranty. If you are not qualified to perform the repair of this product properly and safely, you should not risk trying to do so and refer the repair to a qualified service technician.

WARNING
Lead in solder used in this product is listed by the California Health and Welfare agency as a known reproductive toxicant which may cause birth defects or other reproductive harm (California Health & Safety Code, Section 25249.5).
When servicing or handling circuit boards and other components which contain lead in solder, avoid unprotected skin contact with the solder. Also, when soldering do not inhale any smoke or fumes produced.

1. SAFETY INFORMATION

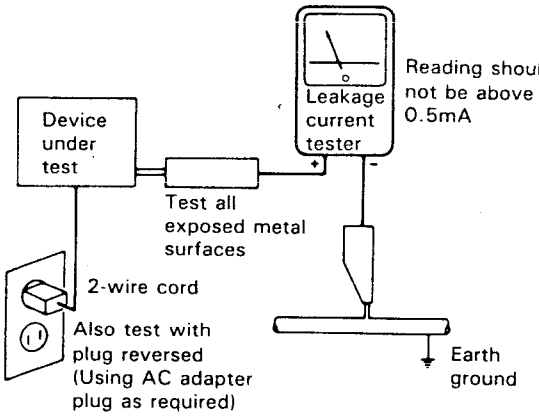
(FOR USA MODEL ONLY)

1. SAFETY PRECAUTIONS

The following check should be performed for the continued protection of the customer and service technician.

LEAKAGE CURRENT CHECK

Measure leakage current to a known earth ground (water pipe, conduit, etc.) by connecting a leakage current tester such as Simpson Model 229-2 or equivalent between the earth ground and all exposed metal parts of the appliance (input/output terminals, screwheads, metal overlays, control shaft, etc.). Plug the AC line cord of the appliance directly into a 120V AC 60Hz outlet and turn the AC power switch on. Any current measured must not exceed 0.5mA.


Reading should not be above 0.5mA
Leakage current tester
Device under test
Test all exposed metal surfaces
2-wire cord
Also test with plug reversed (Using AC adapter plug as required)
Earth ground

AC Leakage Test

ANY MEASUREMENTS NOT WITHIN THE LIMITS OUTLINED ABOVE ARE INDICATIVE OF A POTENTIAL SHOCK HAZARD AND MUST BE CORRECTED BEFORE RETURNING THE APPLIANCE TO THE CUSTOMER.

2. PRODUCT SAFETY NOTICE

Many electrical and mechanical parts in the appliance have special safety related characteristics. These are often not evident from visual inspection nor the protection afforded by them necessarily can be obtained by using replacement components rated for voltage, wattage, etc. Replacement parts which have these special safety characteristics are identified in this Service Manual.

Electrical components having such features are identified by marking with a ⚠ on.the schematics and on the parts list in this Service Manual.
The use of a substitute replacement component which dose not have the same safety characteristics as the PIONEER recommended replacement one, shown in the parts list in this Service Manual, may create shock, fire, or other hazards.

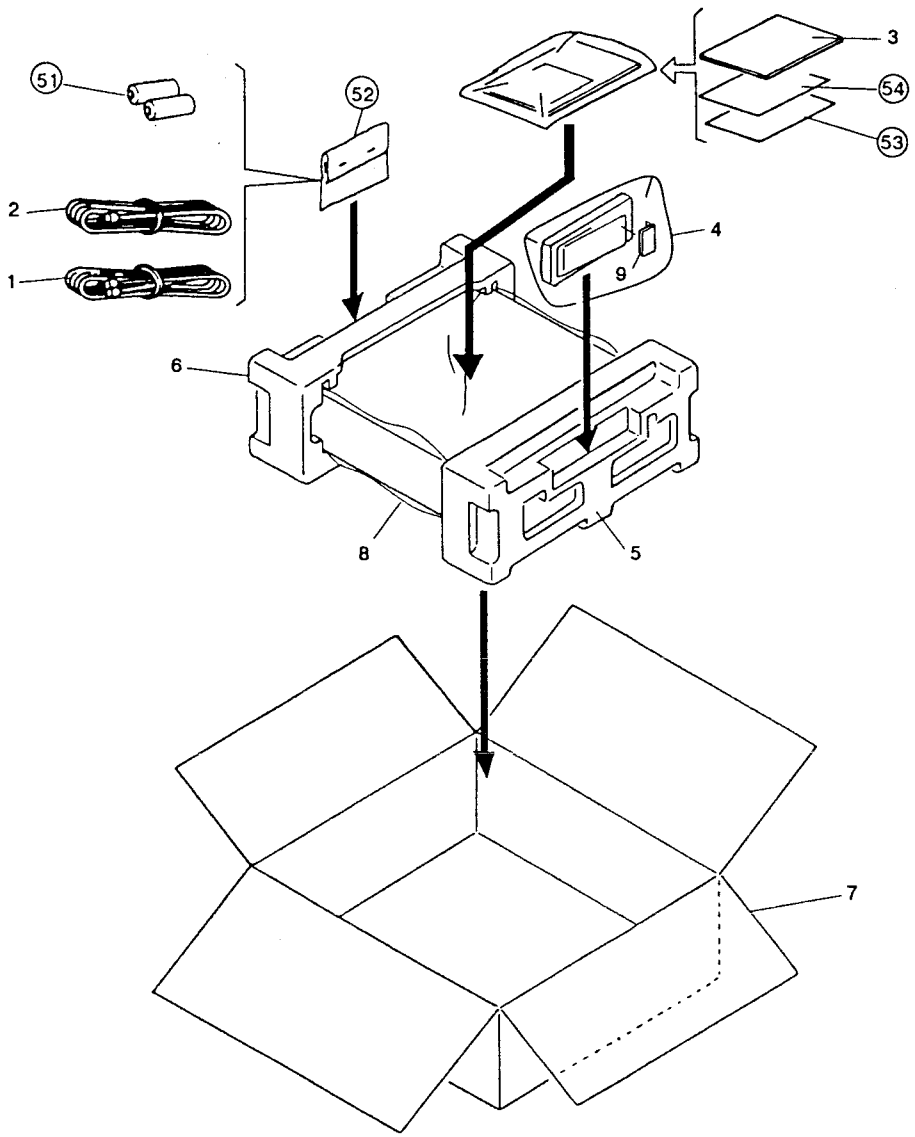
Product Safety is continuously under review and new instructions are issued from time to time. For the latest information, always consult the current PIONEER Service Manual. A subscription to, or additional copies of, PIONEER Service Manual may be obtained at a nominal charge from PIONEER.

2. PACKING

Parts List

Mark	No.	Description	Parts No.
	1.	Connection cord	VDE-055
	2.	Video cable	VDE-056
	3.	Operating instructions (English)	VRB1063
	4.	Remote control unit	VXX1542
	5.	Pad(F)	VHA1084
	6.	Pad(R)	VHA1085
	7.	Packing case	VHG1168
	8.	Mirror mat	VHL1012
	9.	Battery cover	VNK1807

Mark	No.	Description	Parts No.
	51	Dry cell battery(R03,AAA)	
	52	Polyethylene bag	
	53	Caution card	
	54	Caution card(UC)	



3. EXPLODED VIEWS AND PARTS LIST

NOTES :

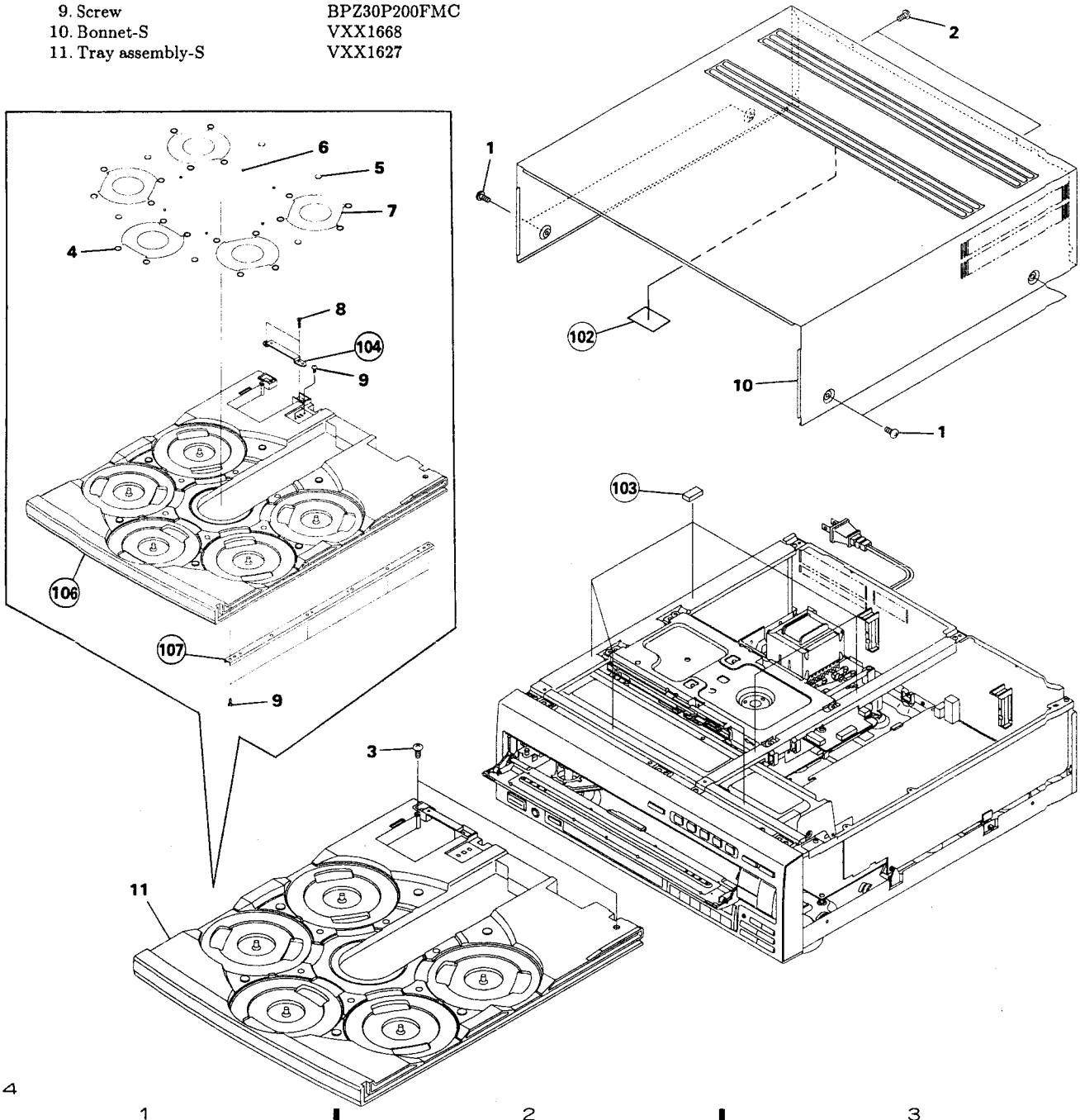
- *The parts with an encircled number are generally unavailable because they are not in our Master Spare Parts List.*
- *The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.*
- *Parts marked by "◉" are not always kept in stock. Their delivery time may be longer than usual or they may be unavailable.*

3. 1 EXTERIOR SECTION

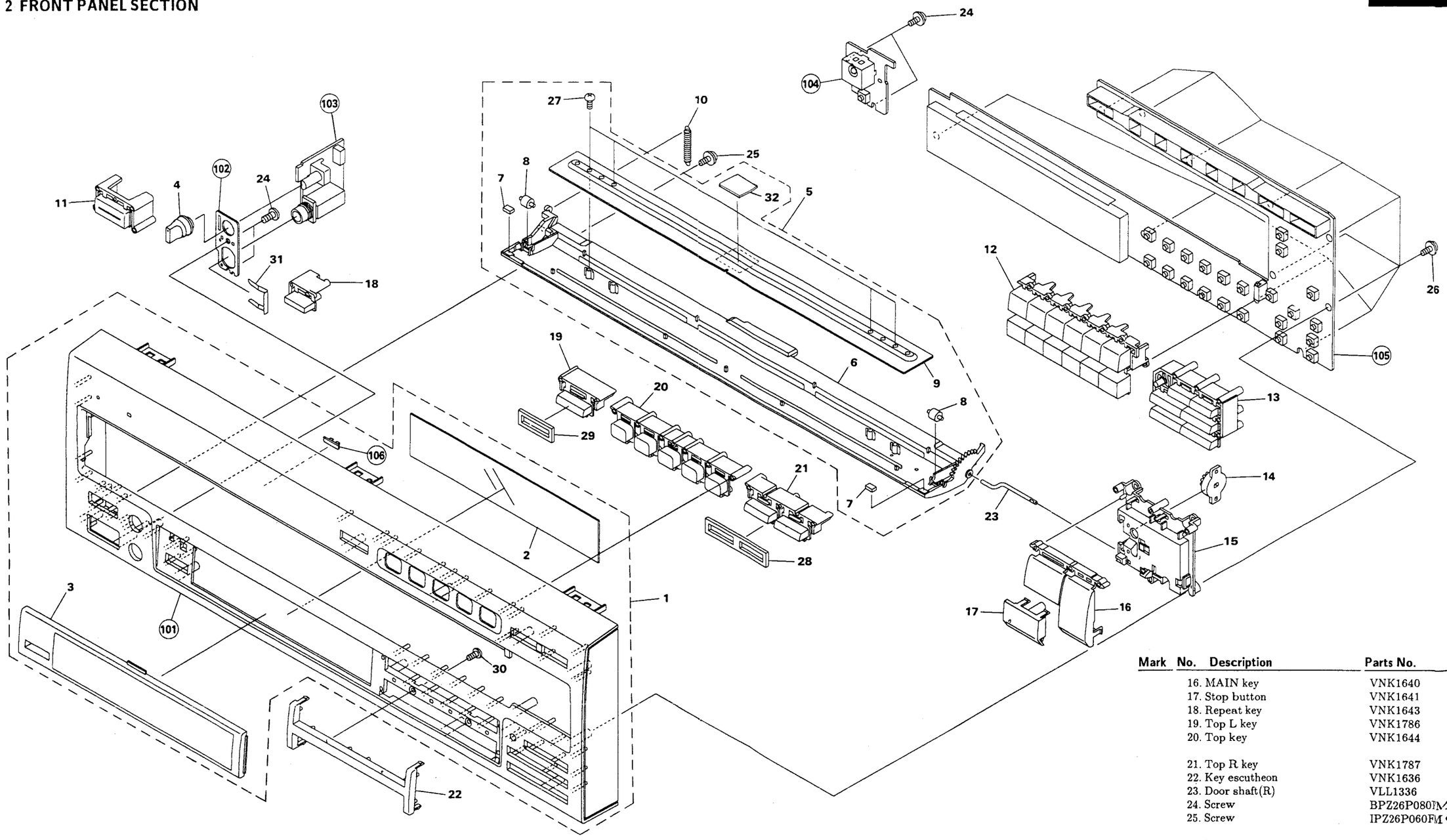
Parts List

Mark	No.	Description	Parts No.
	1.	Screw	BCZ40P060FZK
	2.	Screw	BBZ30P080FCC
	3.	Screw	BPZ30P200FMC
	4.	CD pad	VEC1252
	5.	LD pad(L)	VEC1472
	6.	LD pad(S)	VEC1473
	7.	Tray sheet	VEC1474
	8.	Screw	BPZ30P060FCU
	9.	Screw	BPZ30P200FMC
	10.	Bonnet-S	VXX1668
	11.	Tray assembly-S	VXX1627

Mark	No.	Description	Parts No.
	101	·····	
	102	65 label	
	103	Cushion	
	104	Tray metal	
	105	·····	
	106	Tray	
	107	Tray reinforced plate	



3. 2 FRONT PANEL SECTION



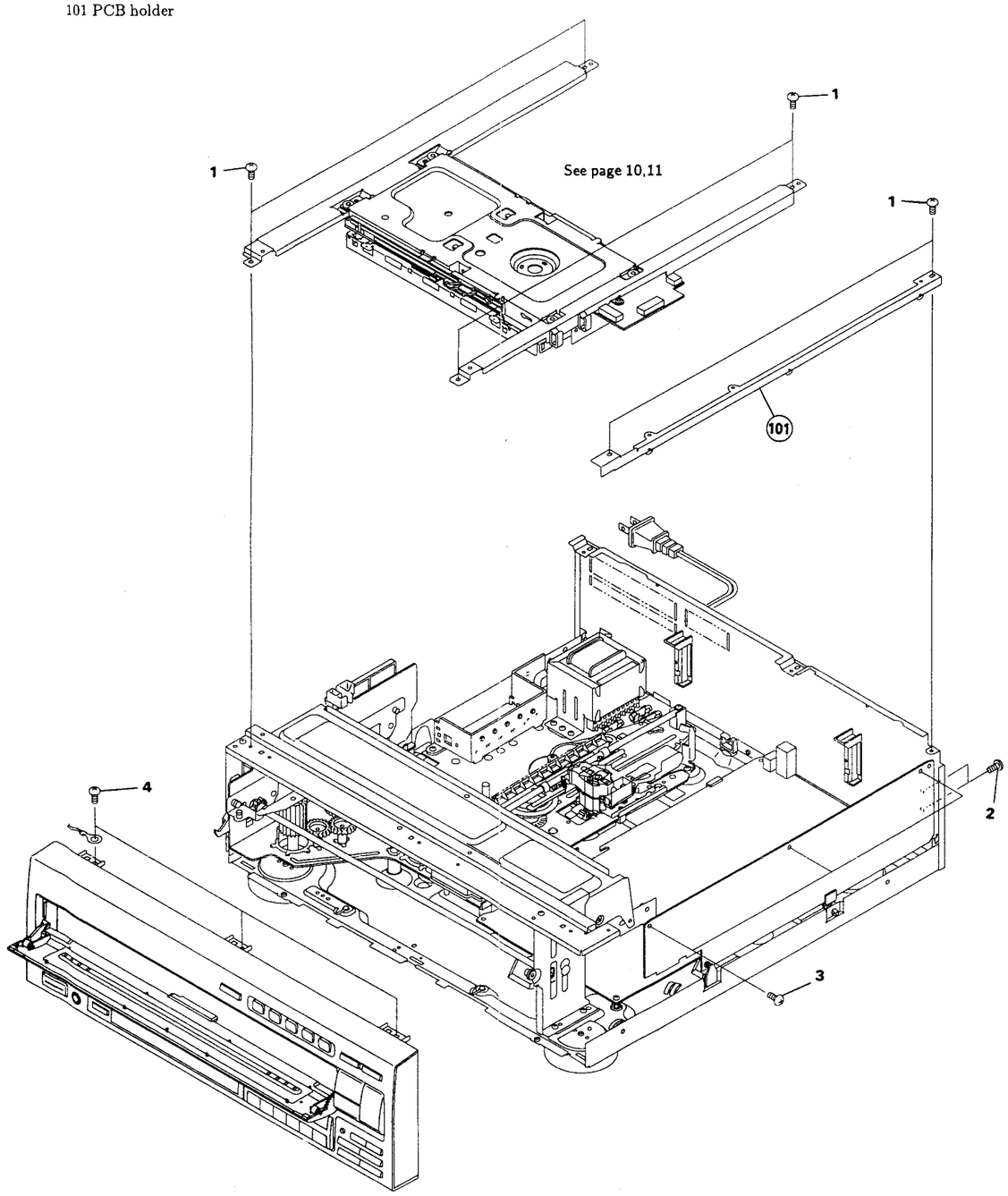
Parts List

Mark	No.	Description	Parts No.
	1.	Front panel assembly-S	VXX1702
	2.	FL filter	VEC1448
	3.	FL lens	VNK1645
	4.	Volume knob	VNK1658
	5.	Door assembly-s	VXX1587
	6.	Door assembly	VXA1570
	7.	Door dump rubber	VEB1141
	8.	Roller	VNL1042
	9.	Door Plate	VNE1769
	10.	Door Spring	VBH1136
	11.	PW button	VNK1649
	12.	Ten key	VNK1639
	13.	Mode key	VNK1642
	14.	Dumper assembly	VXA1053
	15.	Sub panel	VNK1637
	16.	MAIN key	VNK1640
	17.	Stop button	VNK1641
	18.	Repeat key	VNK1643
	19.	Top L key	VNK1786
	20.	Top key	VNK1644
	21.	Top R key	VNK1787
	22.	Key escutheon	VNK1636
	23.	Door shaft(R)	VLL1336
	24.	Screw	BPZ26P080FMC
	25.	Screw	IPZ26P060FMC
	26.	Screw	IPZ26P060FMC
	27.	Screw	BPZ20P040FZK
	28.	Cushion A	VEC1455
	29.	Cushion B	VEC1456
	30.	Screw	BPZ20P060FCU
	31.	Snap plate	VNE1102
	32.	Door pad	VEC1530
101		Front panel	
102		Jack holder	
103		HEPB assembly	
104		PSWB assembly	
105		FLKY assembly	
106		Reinforced plate	

3. 3 TOP VIEW SECTION

Parts List

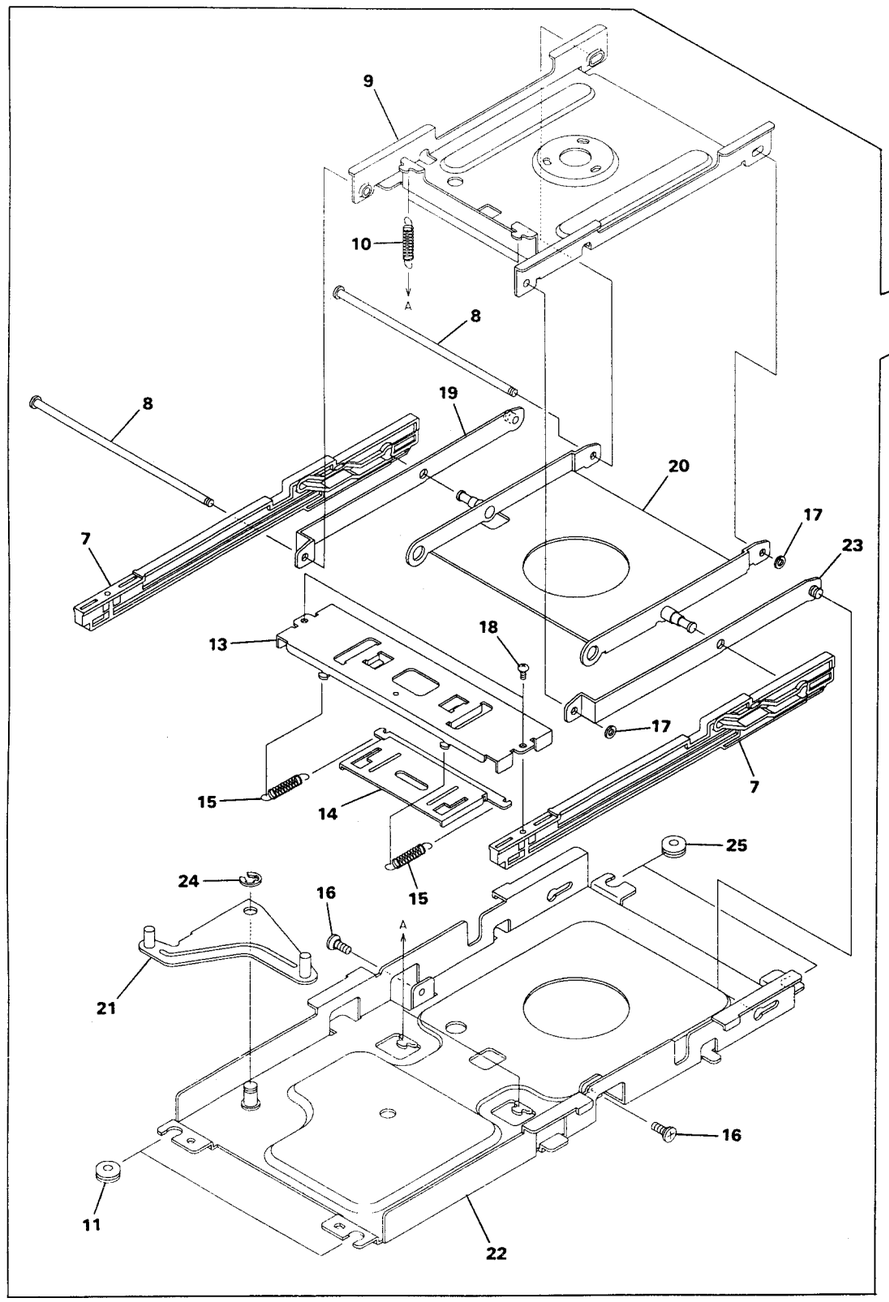
Mark	No.	Description	Parts No.
	1.	Screw	BBZ30P060FCC
	2.	Screw	BBZ30P080FCC
	3.	Screw	BBZ30P060FMC
	4.	Screw	IBZ30P060FCC
	101	PCB holder	



3. 4 CLAMPER ARM SECTION

Parts List

Mark	No.	Description	Parts No.
	1.	Holding spring	VBK1031
	2.	Steel ball	PBP-001
	3.	Screw	VBA1026
	4.	Screw	BPZ26P060FMC
	5.	Screw	BBZ30P060FMC
	6.	·····	
	7.	Clamp cam	VNL1393
	8.	Clamp shaft	VLL1342
	9.	Arm base	VNE1640
	10.	Clamper Spring	VBH1184
	11.	Rubber bushing	VEB1164
	12.	·····	
	13.	Limiter plate	VNE1637
	14.	Slide plate	VNE1638
	15.	Limiter spring	VBH1182
	16.	Pivot screw	VBA1022
	17.	Washer	WT26D060D050
	18.	Screw	BPZ26P060FCU
	19.	Lever (A) assembly	VXA1607
	20.	Lever (B) assembly	VXA1608
	21.	Lever (D) assembly	VXA1610
	22.	Center plate assembly	VXA1606
	23.	Lever (C) assembly	VXA1609
	24.	E ring	YE40FUC
	25.	Rubber bushing	VEB1164
	26.	Arm assembly	VWT1071
	27.	Guide sheet	VEC1521
	101	Angle(L)	
	102	Center angle	
	103	Wire clip	
	104	·····	
	105	SR board assembly	
	106	Center plate assembly	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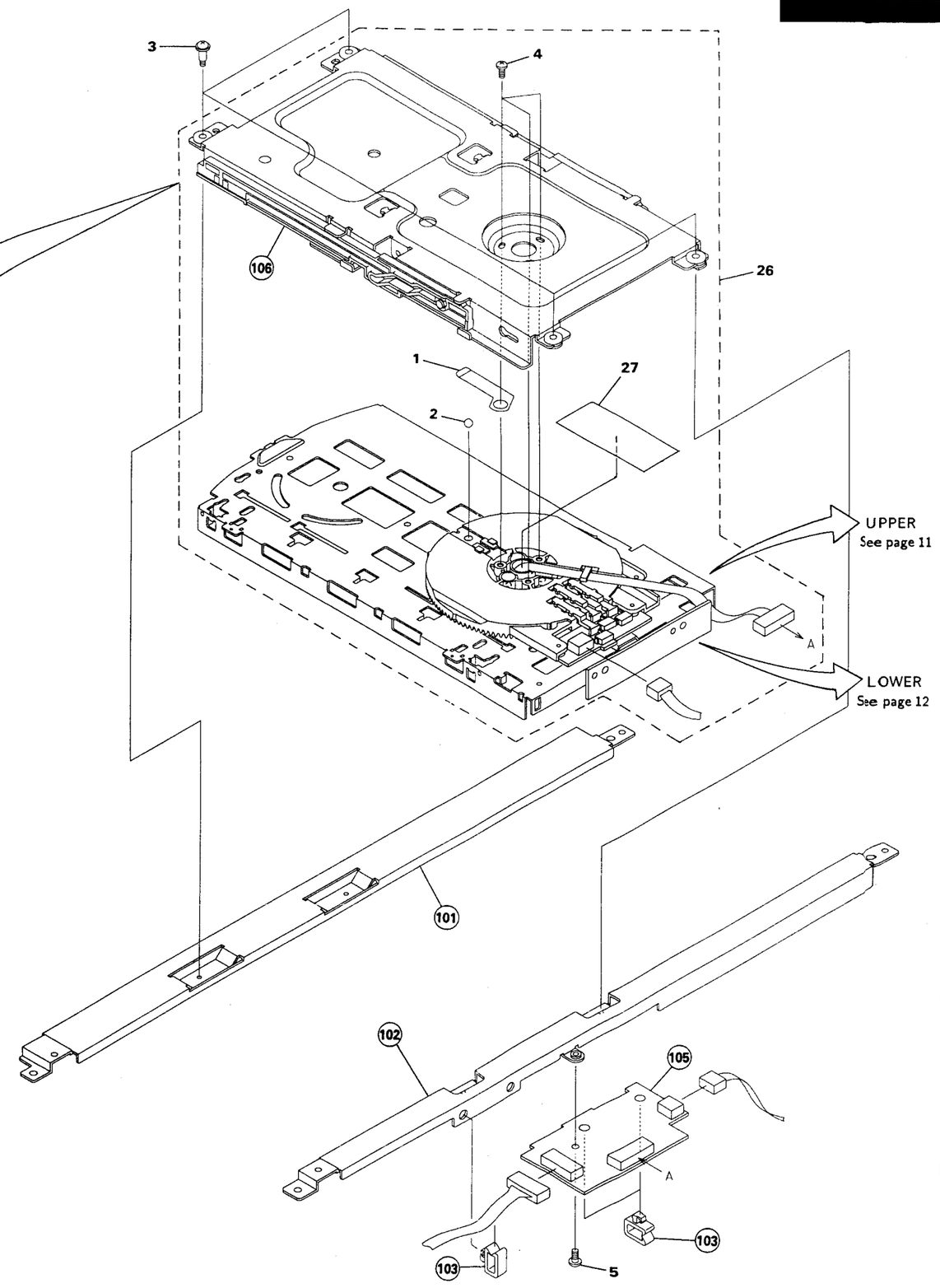
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UPPER
See page 11
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LOWER
See page 12
101
102
105
A
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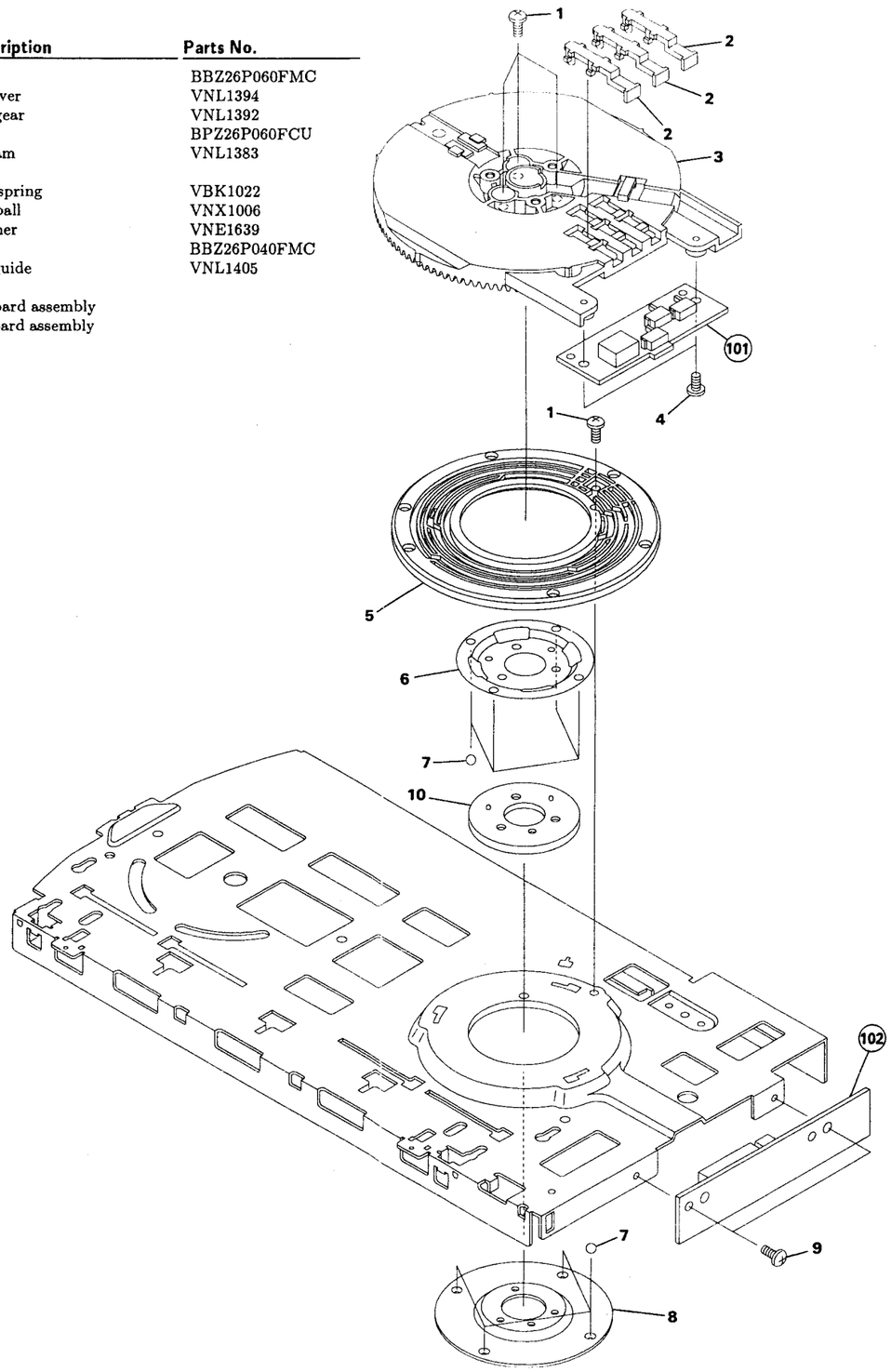
5

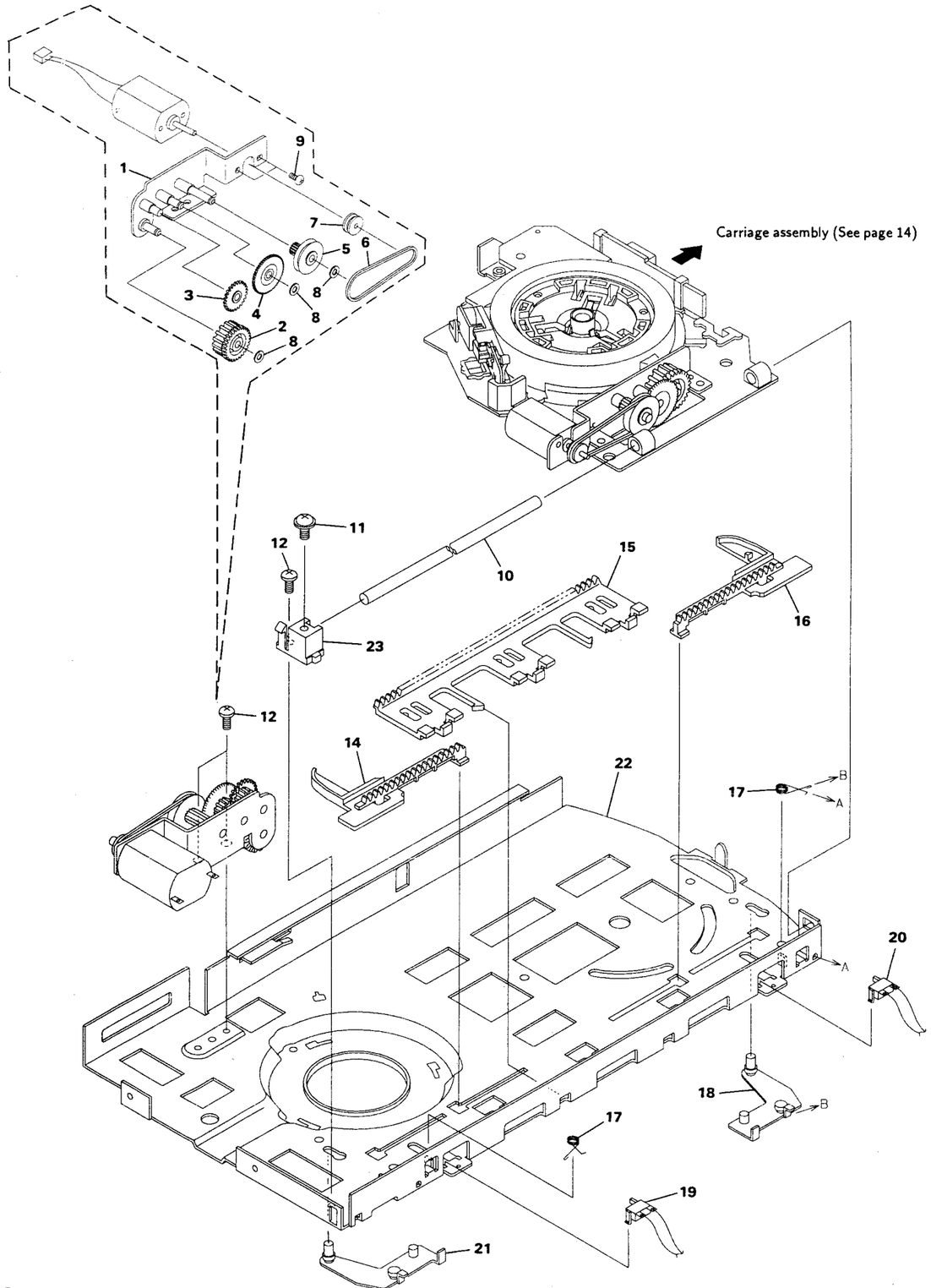
3. 5 CLAMPER ARM (UPPER)

Parts List

Mark	No.	Description	Parts No.
	1.	Screw	BBZ26P060FMC
	2.	SW lever	VNL1394
	3.	Base gear	VNL1392
	4.	Screw	BPZ26P060FCU
	5.	SW cam	VNL1383
	6.	Plate spring	VBK1022
	7.	Steel ball	VNX1006
	8.	Retainer	VNE1639
	9.	Screw	BBZ26P040FMC
	10.	Arm guide	VNL1405
	101	TD board assembly	
	102	FR board assembly	



3. 6 CLAMPER ARM (LOWER)



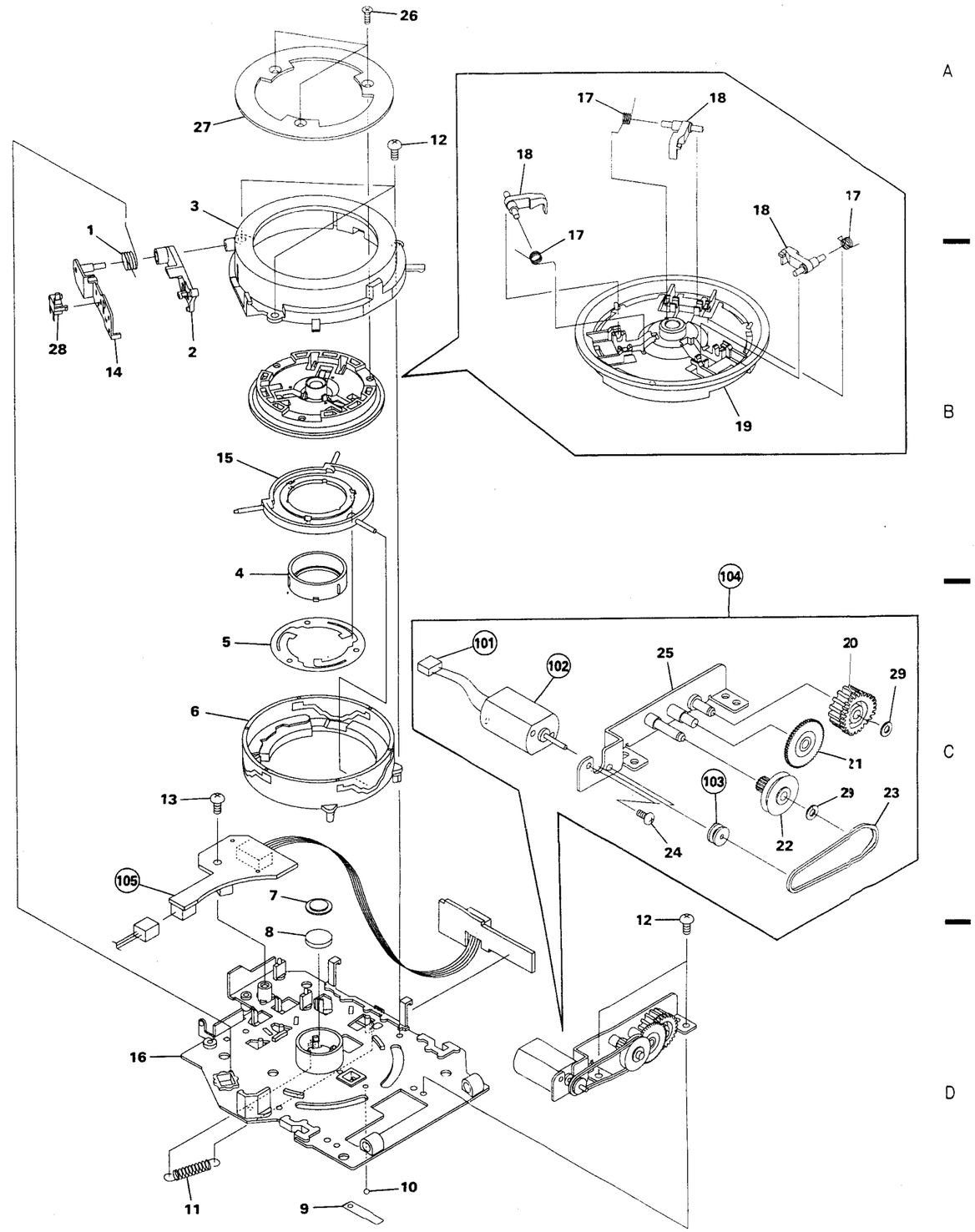
3. 7 CARRIAGE ASSEMBLY

Parts List

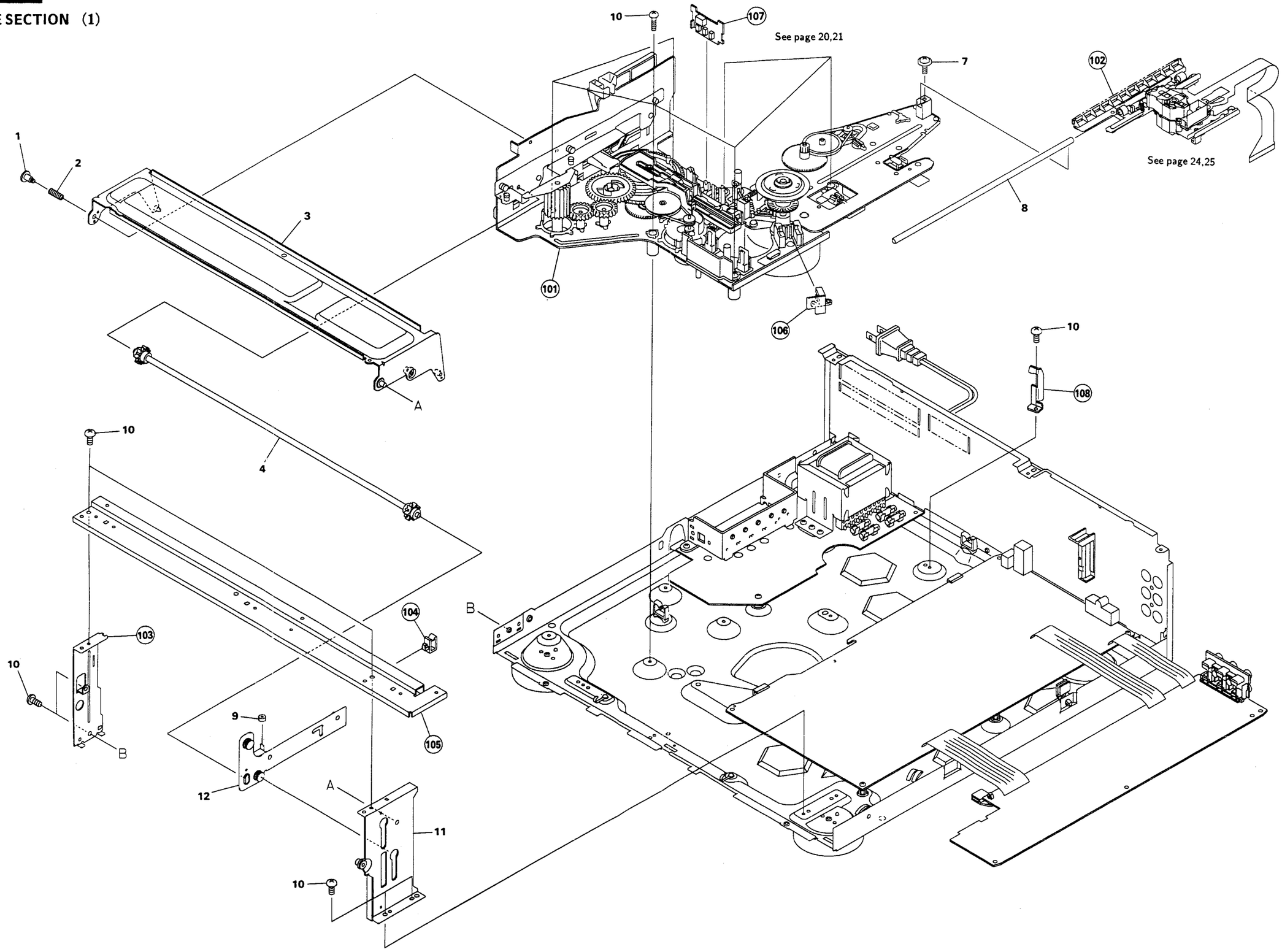
Mark	No.	Description	Parts No.
	1.	M holder (T) assembly	VXA1596
	2.	Gear (C)	VNL1378
	3.	Idler gear	PNW1098
	4.	Gear (A)	VNL1376
	5.	Gear pulley	VNL1375
	6.	Belt	DEB1104
	7.	Motor pulley (T)	VLL1357
	8.	Washer	WT26D047D025
	9.	Screw	PMA20P040FMC
	10.	Guide shaft	VLL1341
	11.	Screw	IPZ30P060FMC
	12.	Screw	BBZ26P040FMC
	13.	.....	
	14.	Slide rack (R)	VNL1382
	15.	Rack	VNL1380
	16.	Slide rack (F)	VNL1381
	17.	Lever spring	VBH1156
	18.	Change lever (F) assembly	VXA1598
	19.	SW (IN)	DSG1014
	20.	SW (OUT)	DSG1014
	21.	Change lever (R) assembly	VXA1599
	22.	Rotate arm	VNE1631
	23.	Shaft holder	VNL1384

Parts List

Mark	No.	Description	Parts No.
	1.	Sensor spring	VBH1158
	2.	Sensor lever	VNL1390
	3.	Clamper holder	VNL1386
	4.	Slider	VNL1388
	5.	Lock plate	VBK1028
	6.	Inside cam	VNL1389
	7.	Ball holder	VNL1289
	8.	Rubber sheet	VEB1114
	9.	Plate spring(C)	VBK1025
	10.	Steel ball	VNX1010
	11.	Lever spring(C)	VBH1165
	12.	Screw	BBZ26P040FMC
	13.	Screw	BPZ26P060FCU
	14.	Sensor base assembly	VXA1601
	15.	Cam lever assembly	VXA1600
	16.	Carriage assembly	VXA1602
	17.	Holder Spring	VBH1162
	18.	CD holder	VNL1387
	19.	Disc Clamper	VNL1385
	20.	Gear(C)	VNL1378
	21.	Gear(A)	VNL1376
	22.	Gear pulley	VNL1375
	23.	Belt	DEB1104
	24.	Screw	PMA20P040FMC
	25.	M holder (C) assembly	VXA1597
	26.	Screw	CPZ20P050FMC
	27.	Stabilizer	VNE1749
	28.	Sensor switch	DSG1014
	29.	Washer	WT26D047D025
	101	Housing assembly	
	102	Carriage motor	
	103	Motor pulley (C)	
	104	Carriage motor assembly	
	105	CF+CS assembly	



3. 8 BASE SECTION (1)

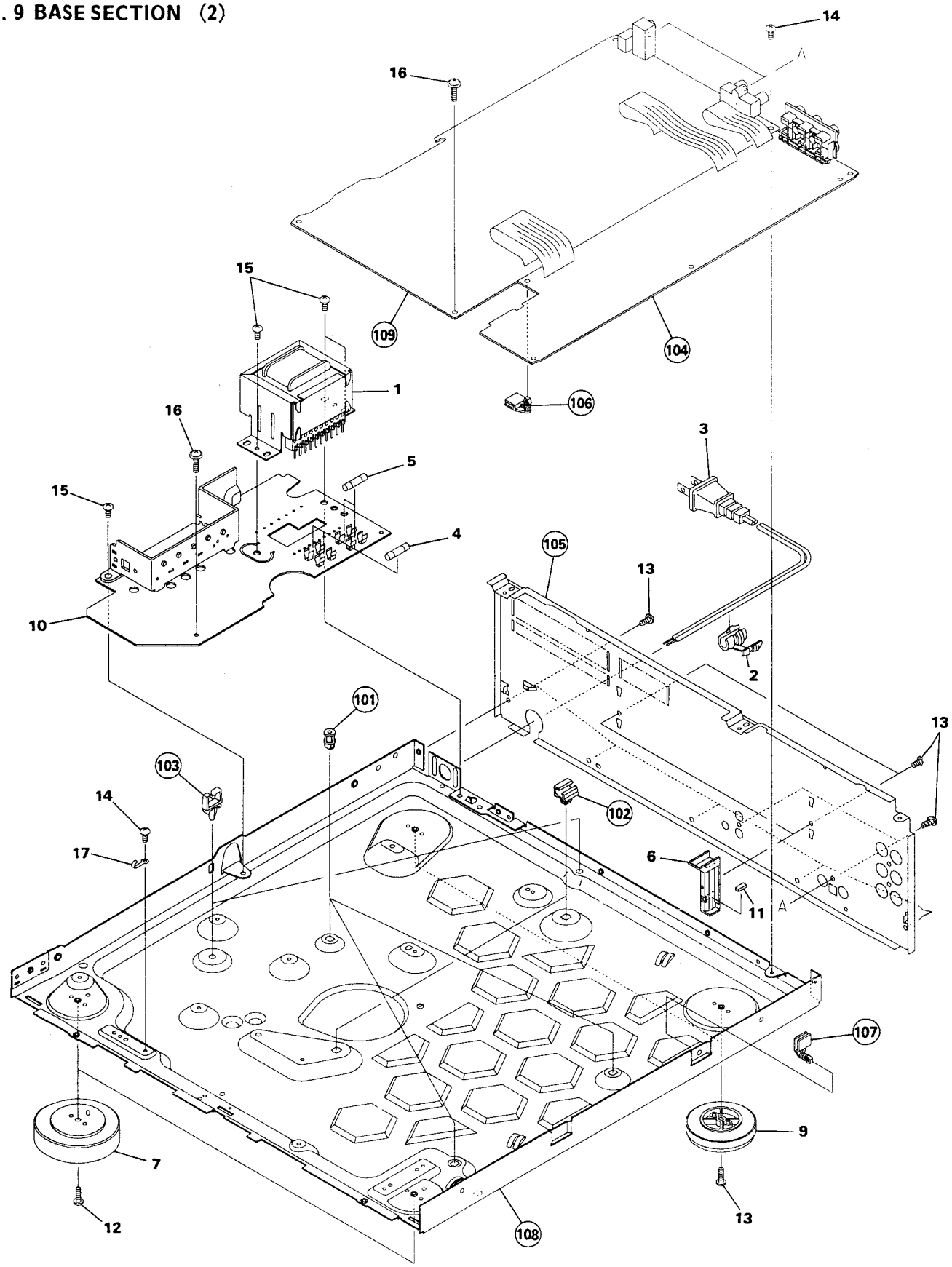


Parts List

Mark	No.	Description	Parts No.
	1.	Screw(B)	VBA1008
	2.	Arm spring	VBH1093
	3.	Synchronized arm assembly	VXA1771
	4.	Synchronized gear assembly	VXA1605
	5.	.....	
	6.	.....	
	7.	Screw (B)	VBA1018
	8.	Carriage shaft	VLL1177
	9.	Stop ring	VEB1091
	10.	Screw	BBZ30P060FCC
	11.	Stay (R) assembly	VXA1603
	12.	Roller board (R) assembly	VXA1772

Mark	No.	Description	Parts No.
	101	Mechanism assembly	
	102	Rack assembly	
	103	Side stay (L)	
	104	Wire clip	
	105	Front angle	
	106	FG board assembly	
	107	SW board assembly	
	108	SM head stopper	

3. 9 BASE SECTION (2)



Parts List

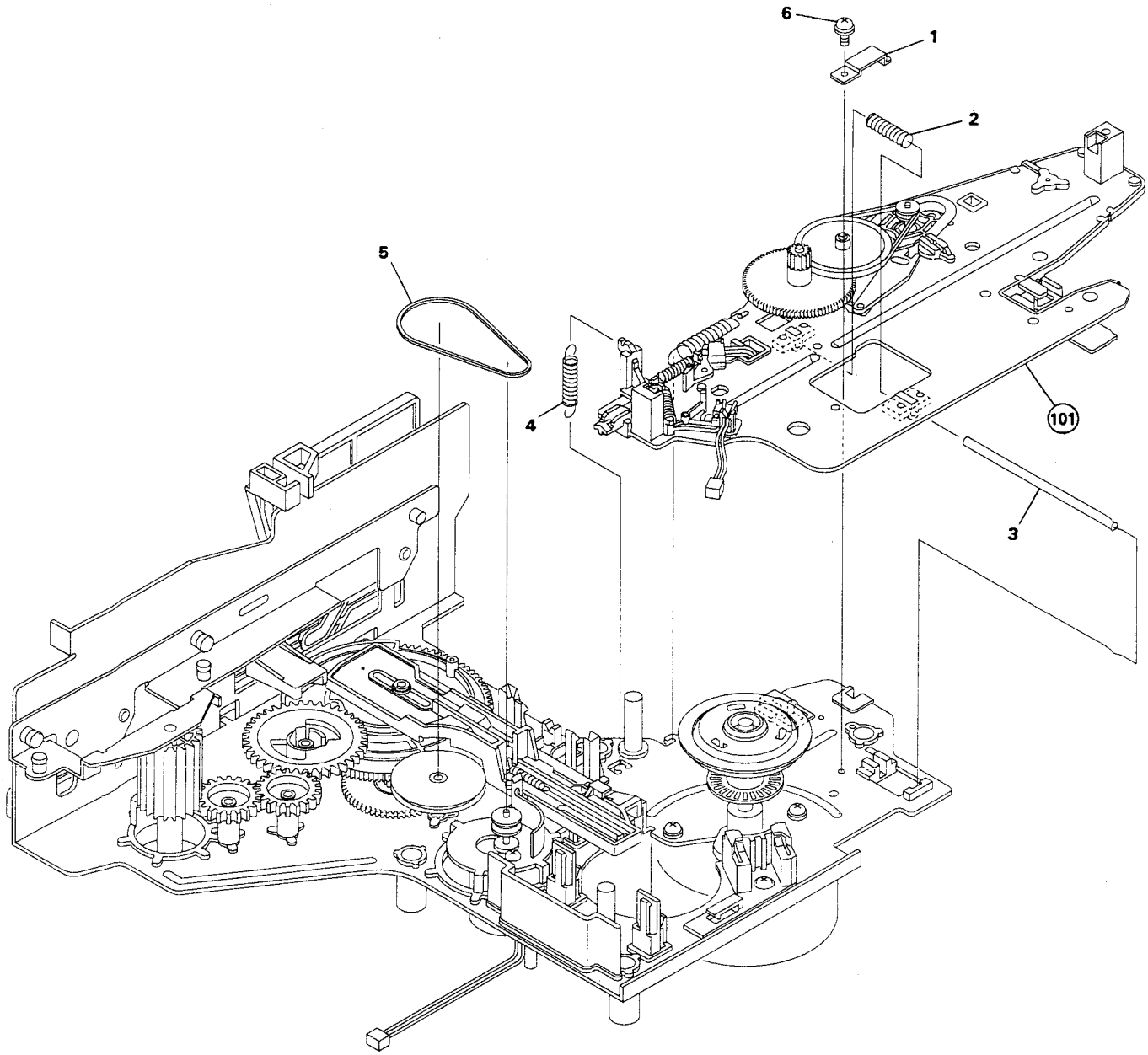
Mark	No.	Description	Parts No.
	1.	Power transformer	VTT1096
	2.	AC cord stopper	CM-22C
	3.	AC power cord	PDG1015
	4.	Fuse (1A)	REK-080
	5.	Fuse (3A)	VEK-018
	6.	Tray stopper	VNL1202
	7.	Insulator assembly	VXA1776
	8.	.....	
	9.	Insulator assembly	VXA1775
	10.	SYPS assembly	VWR1108
	11.	Door dump rubber	VEB1033
	12.	Screw	BBZ30P140FCC
	13.	Screw	BBZ30P080FCC
	14.	Screw	BBZ30P060FCC
	15.	Screw	BCZ40P080FZK
	16.	Screw	IPZ30P160FMC
	17.	Cord holder	VNF-069

Mark	No.	Description	Parts No.
	101	PCB spacer	
	102	P board holder	
	103	Wire clip (B)	
	104	Audio board assembly	
	105	Rear panel	
	106	PCB holder	
	107	PCB holder	
	108	Base chassis	
	109	MAIN board assembly	

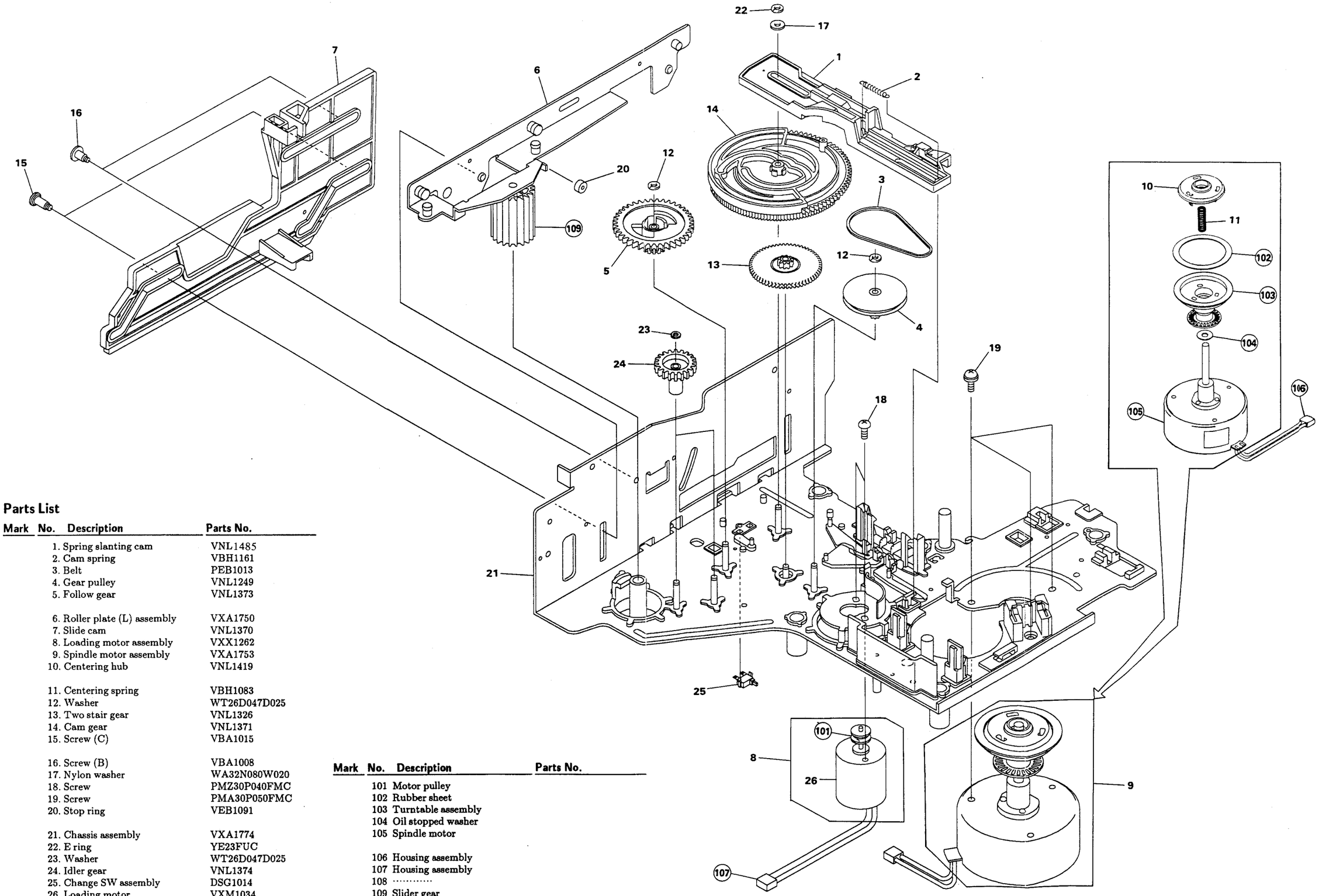
3. 10 MECHANISM ASSEMBLY (1)

Parts List

Mark	No.	Description	Parts No.
	1.	Plate spring	VBK1013
	2.	Thrust spring	VBH1073
	3.	Tilt shaft	VLL1175
	4.	Tilt pulling spring	VBH1074
	5.	Belt	PEB1013
	6.	Screw	ABZ26P050FMC
	101	Cam head stopper	



3. 11 CHASIS SECTION



Parts List

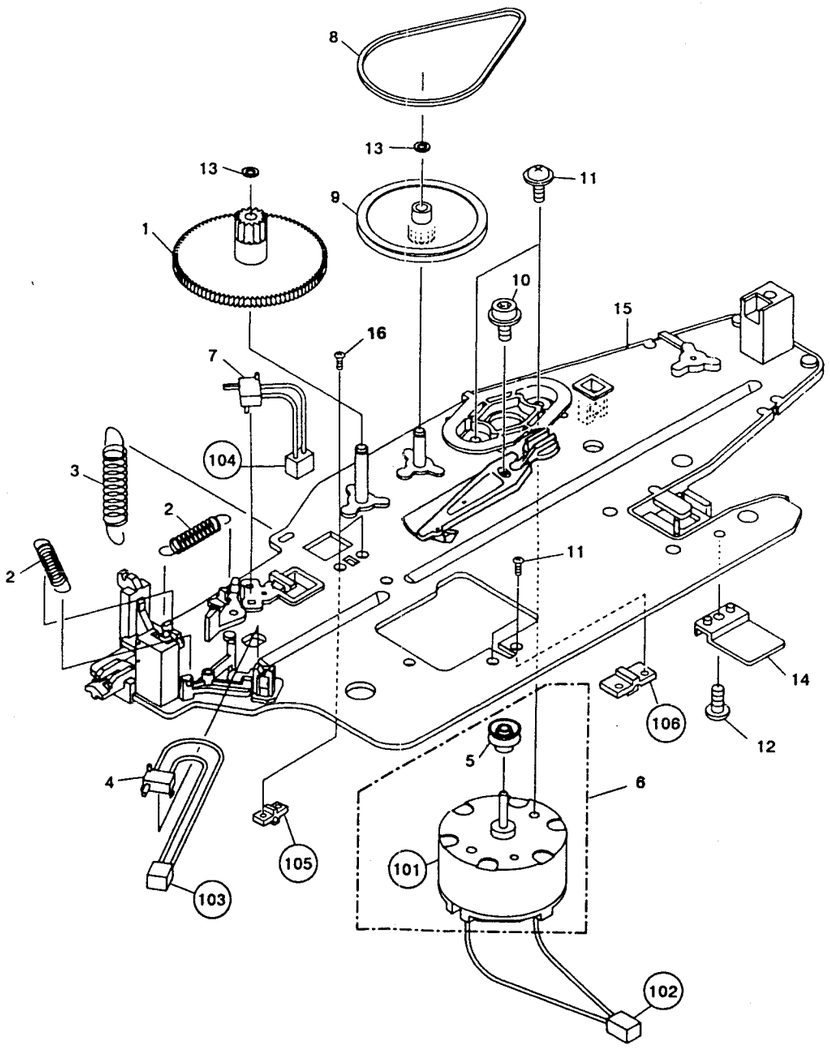
Mark	No.	Description	Parts No.
	1.	Spring slanting cam	VNL1485
	2.	Cam spring	VBH1161
	3.	Belt	PEB1013
	4.	Gear pulley	VNL1249
	5.	Follow gear	VNL1373
	6.	Roller plate (L) assembly	VXA1750
	7.	Slide cam	VNL1370
	8.	Loading motor assembly	VXX1262
	9.	Spindle motor assembly	VXA1753
	10.	Centering hub	VNL1419
	11.	Centering spring	VBH1083
	12.	Washer	WT26D047D025
	13.	Two stair gear	VNL1326
	14.	Cam gear	VNL1371
	15.	Screw (C)	VBA1015
	16.	Screw (B)	VBA1008
	17.	Nylon washer	WA32N080W020
	18.	Screw	PMZ30P040FMC
	19.	Screw	PMA30P050FMC
	20.	Stop ring	VEB1091
	21.	Chassis assembly	VXA1774
	22.	E ring	YE23FUC
	23.	Washer	WT26D047D025
	24.	Idler gear	VNL1374
	25.	Change SW assembly	DSG1014
	26.	Loading motor	VXM1034

Mark	No.	Description	Parts No.
	101	Motor pulley	
	102	Rubber sheet	
	103	Turntable assembly	
	104	Oil stopped washer	
	105	Spindle motor	
	106	Housing assembly	
	107	Housing assembly	
	108	·····	
	109	Slider gear	

3. 12 SERVO MECHANISM BASE SECTION

Parts List

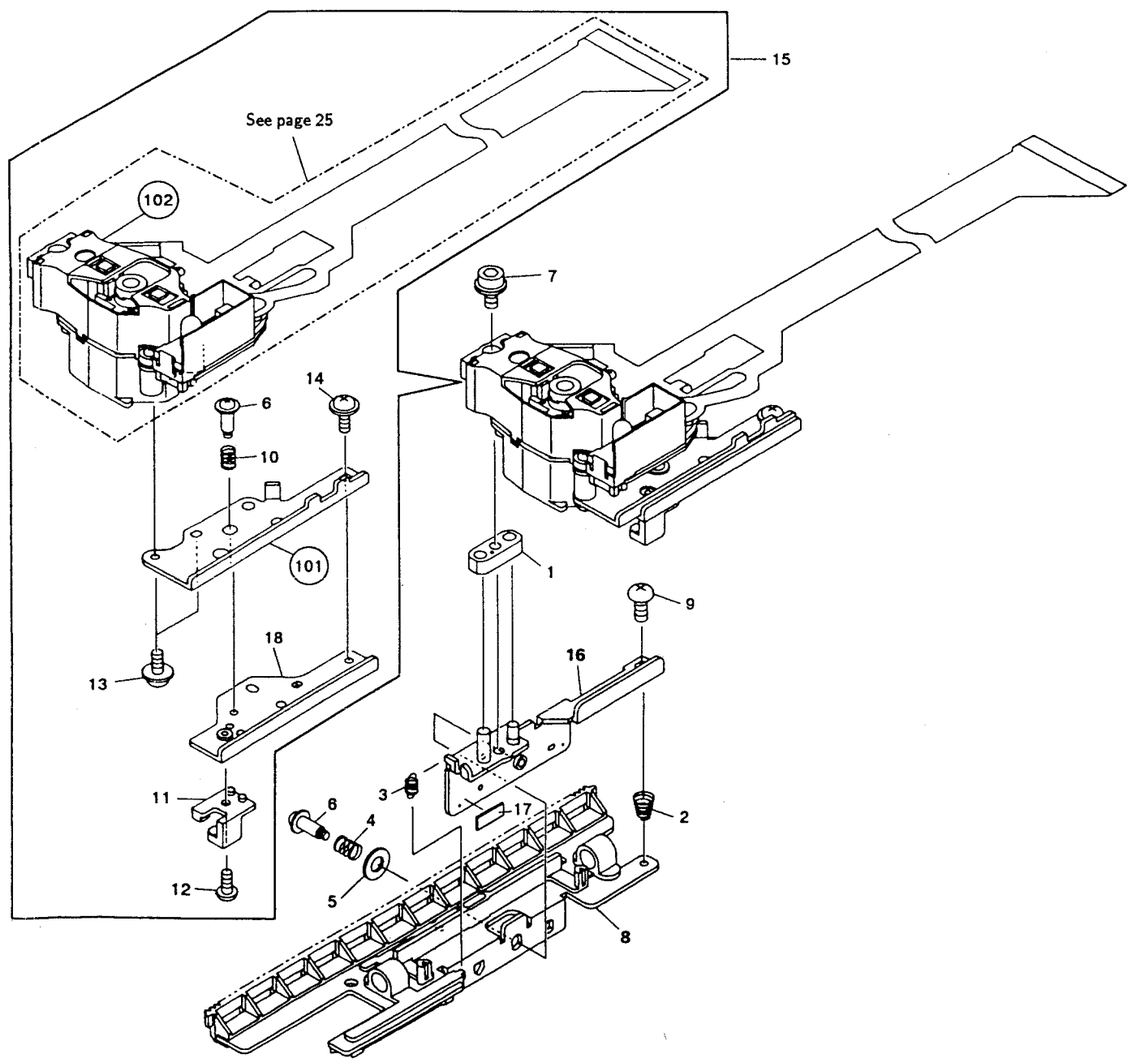
Mark	No.	Description	Parts No.
	1.	CA gear (3)	VNL1196
	2.	Switch pulling spring	VBH1079
	3.	TC pulling spring	VBH1181
	4.	Push switch(S5 : CD/CDV)	DSG1014
	5.	CA pulley(1)	VNL1197
	6.	Carriage motor assembly	VXX1261
	7.	Push switch(S4 : LD/CD)	DSG1014
	8.	CA belt	VEB1077
	9.	CA pulley (2)	VNL1198
	10.	Screw	SMF30H080FBT
	11.	Screw	PMM26P040FMC
	12.	Screw	BPZ26P050FMC
	13.	Washer	WT26D047D025
	14.	FLE base	VNL1341
◉	15.	Servo mechanism base assembly-S	VXA1583
	16.	Screw	PMZ26P040FMC
	101	Carriage motor	
	102	Housing assembly	
	103	Housing assembly	
	104	Housing assembly	
	105	Holder(A)	
	106	Holder(B)	



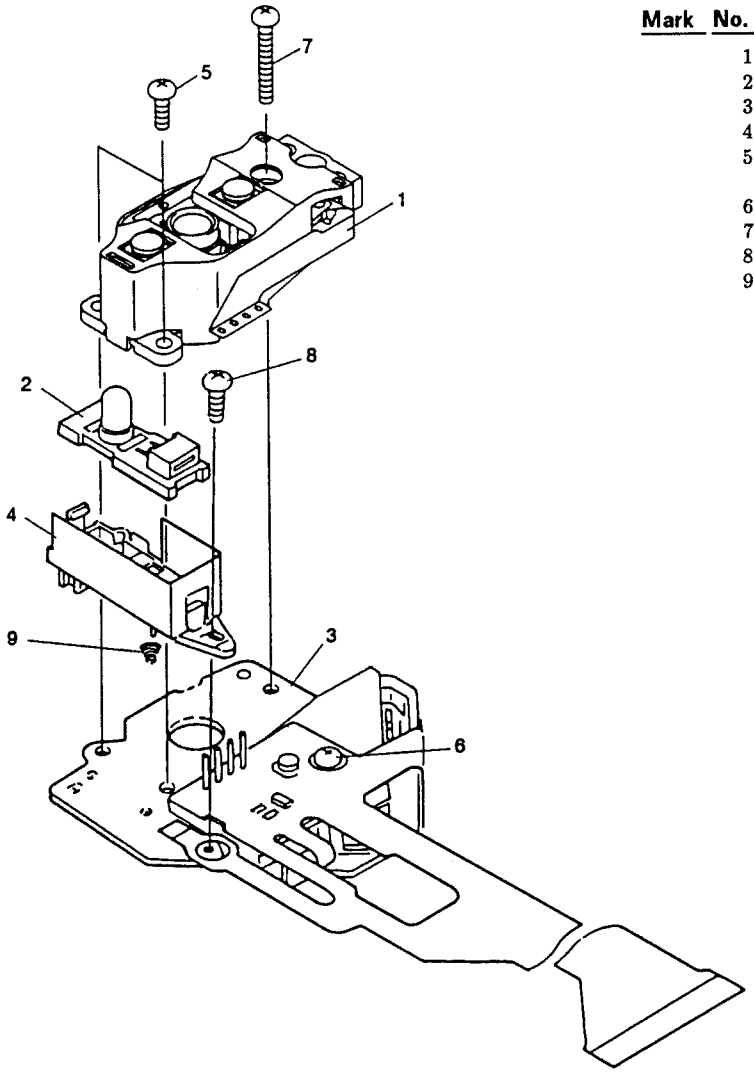
3. 13 RACK SECTION

Parts List

Mark	No.	Description	Parts No.
	1.	PU base	VNL1209
	2.	LP center spring	VBH1075
	3.	PU pulling spring	VBH1089
	4.	L-2 sprint	VBH1090
	5.	Washer	WC30FMC
	6.	Screw	VBA1007
	7.	Screw(2.6 × 10)	VLL1192
◉	8.	Rack	VNL1186
	9.	Screw	BMZ26P080FMC
	10.	TAN spring	VBH1081
	11.	TAN base	VNL1199
	12.	Screw	PMZ20P040FMC
	13.	Screw	PMA20P040FMC
	14.	Screw	AMZ20P050FMC
	15.	Slider assembly	VWT1060
	16.	PU mount base assembly	VXA1567
	17.	Spacer (S)	VEC1284
	18.	TAN plate (1)	VNE1606
	101	TAN plate (2)	
	102	Pickup assembly	



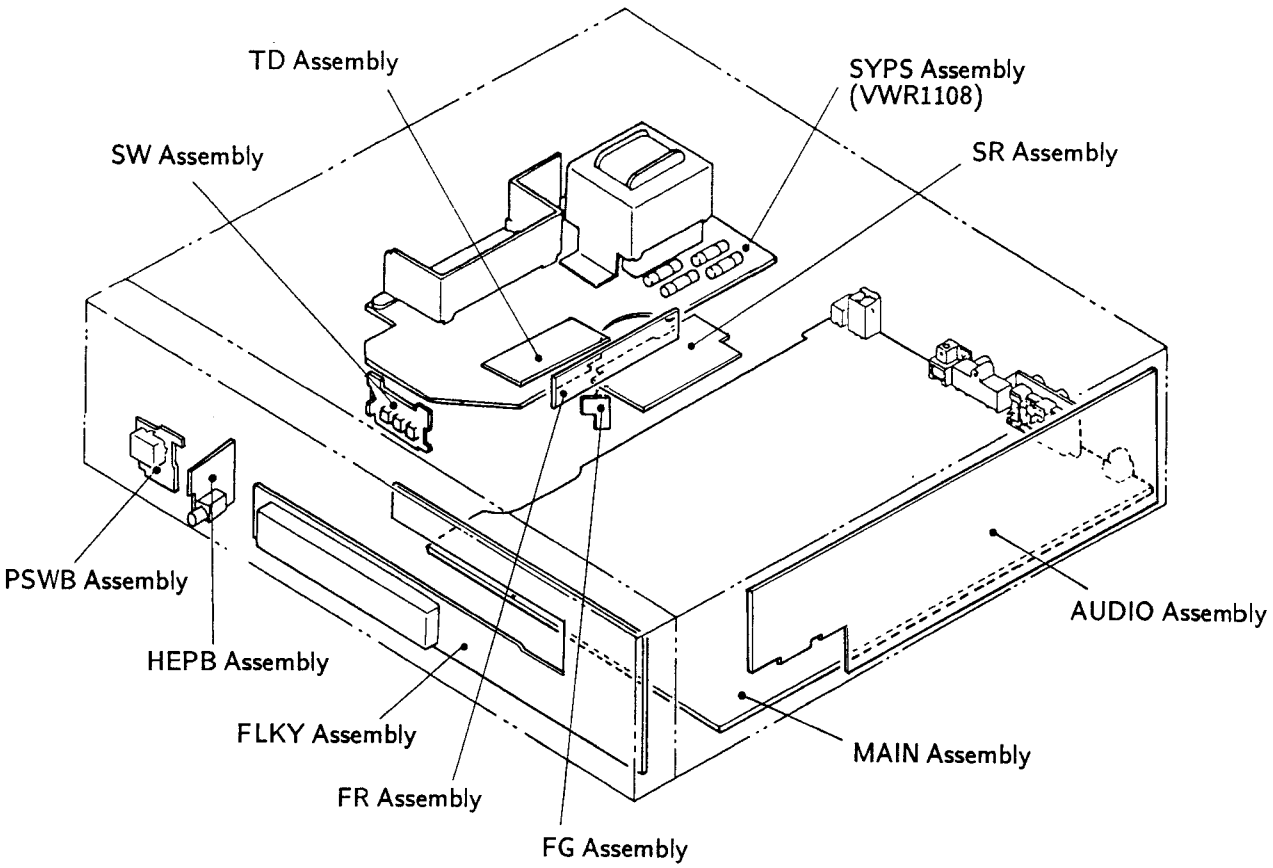
3.14 PICKUP ASSEMBLY



Parts List

Mark	No.	Description	Parts No.
	1.	Actuator assembly	VXX1551
	2.	Sensor assembly	VEX1018
	3.	Pre-pickup assembly	VXX1413
	4.	Sensor stay	VNH1024
	5.	Screw	PMA20P060FMC
	6.	Screw	PMA20P080FMC
	7.	Screw	PMA20P140FMC
	8.	Screw	BMZ20P060FMC
	9.	Sensor spring	VBH1087

4. P.C. BOARDS LOCATION



MOTHER ASSEMBLY(VWM1198)

MOTHER assembly is composed of MAIN, FG, SW and AUDIO assemblies.

FLKB ASSEMBLY (VWM1199)

FLKB assembly is composed of FLKY, PSWB and HEPB assemblies.

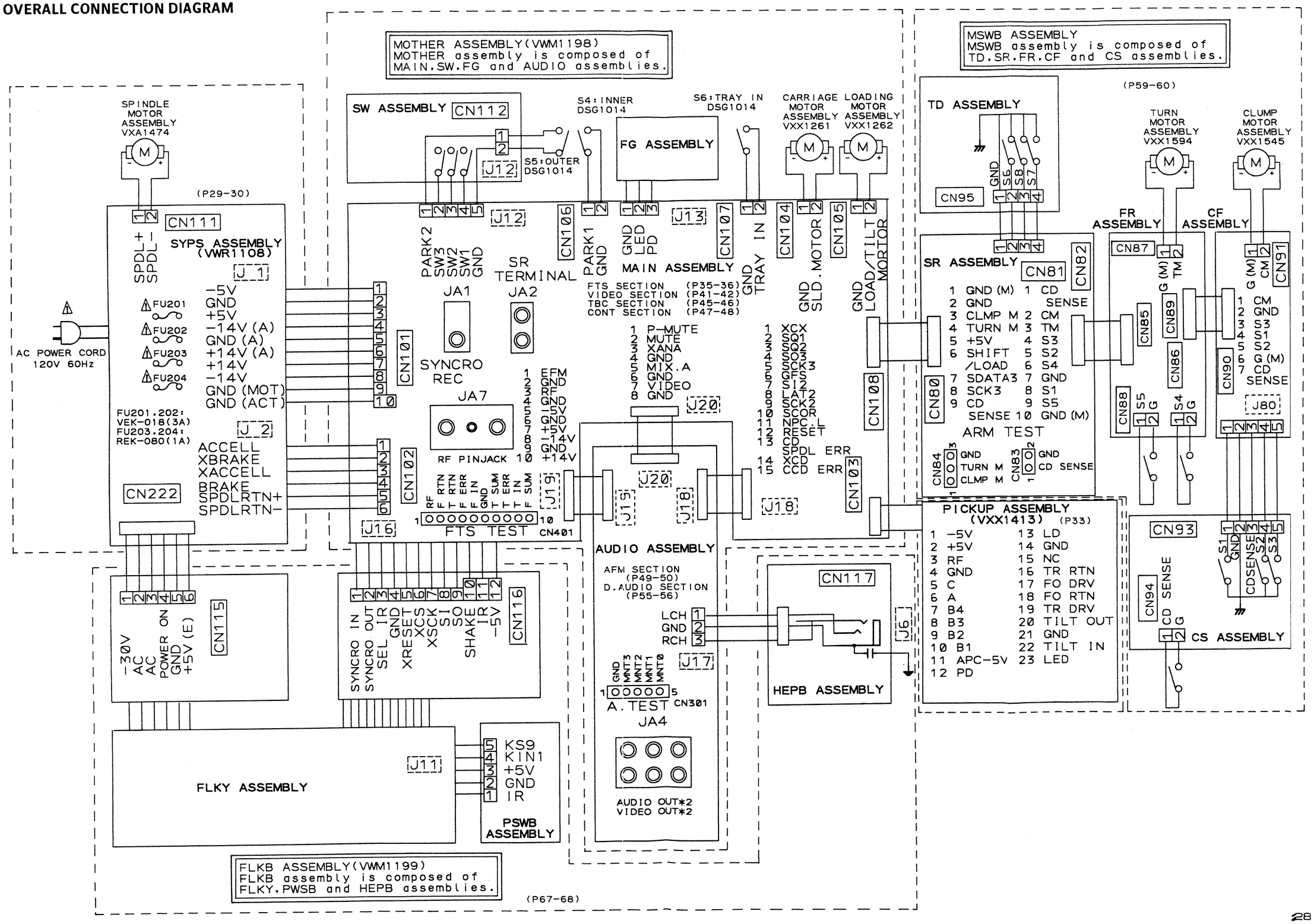
MSWB ASSEMBLY

MSWB assembly is composed of SR, FR, CF, CS, and TD assemblies.

MAIN	: **MAIN** BOARD
FG	: **FG** COUNTER BOARD
SW	: **SW** BOARD
AUDIO	: **AUDIO** BOARD
FLKY	: **FL** TUBE AND **KEY** BOARD
PSWB	: **P**OWER **S**WITCH **B**OARD
HEPB	: **HE**ADPHONE **B**OARD
SYPS	: **SY**STEM **P**OWER **S**UPPLY
SR	: **S**OLID **R**ELAY BOARD
FR	: **F**LEXIBLE **R**ELAY BOARD
CF	: **C**ARRIAGE **F**LEXIBLE BOARD
CS	: **C**ARRIAGE **S**WITCH BOARD
TD	: **T**URN **D**ETECTION BOARD

5. SCHEMATIC DIAGRAM AND P.C. BOARDS CONNECTION DIAGRAM

5.1 OVERALL CONNECTION DIAGRAM



5.2 SYPS ASSEMBLY(VWR 1108)

Q201, Q204,
Q206 : 2SD1762
Q202, Q203,
Q205 : 2SB1185
Q207 : 2SB1238X
Q214, Q219 : 2SA933S
Q213 : DTC114ES
Q218 : 2SC1740S
Q217 : DTA114ES

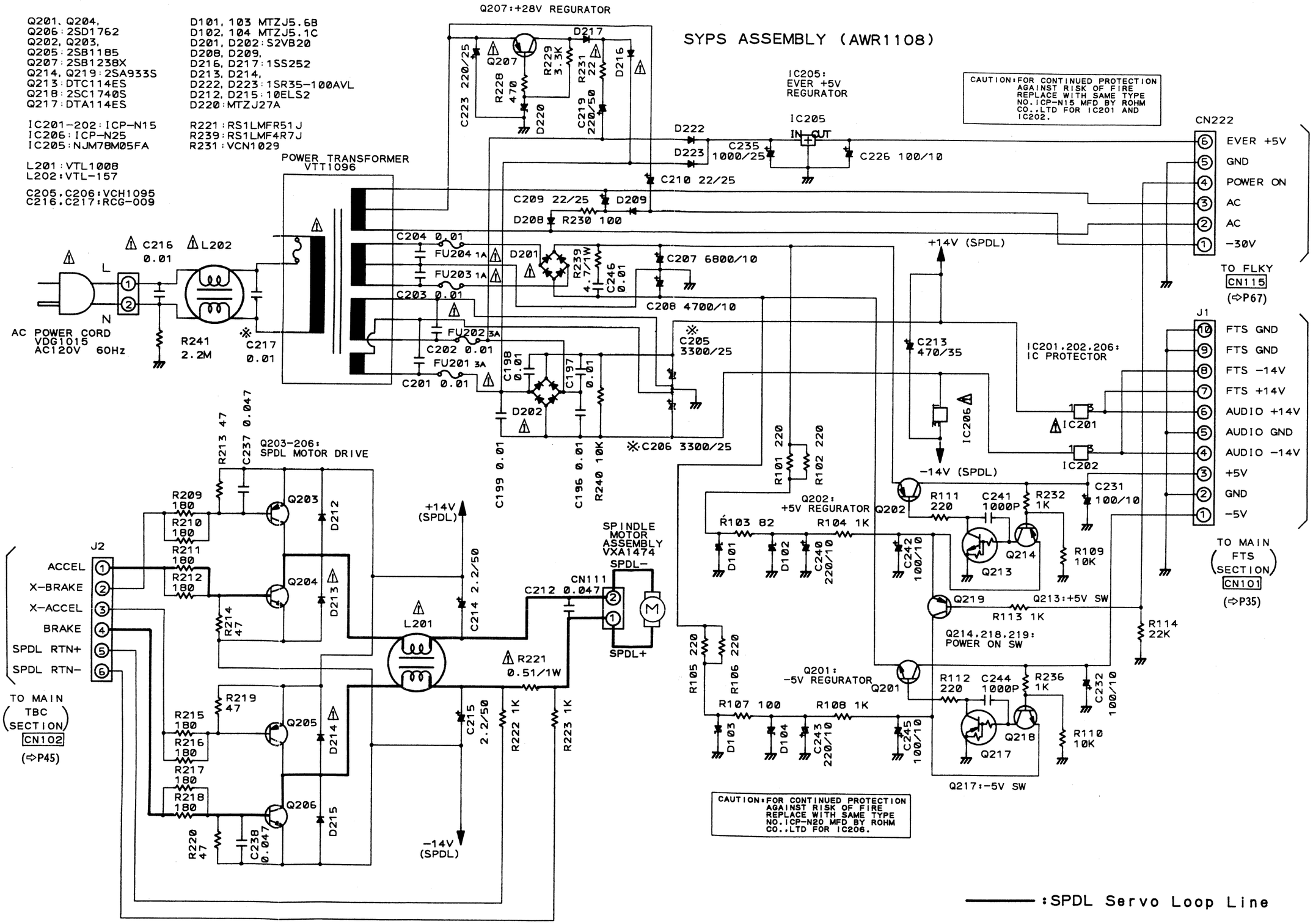
IC201-202 : ICP-N15
IC206 : ICP-N25
IC205 : NJM78M05FA

L201 : VTL1008
L202 : VTL-157

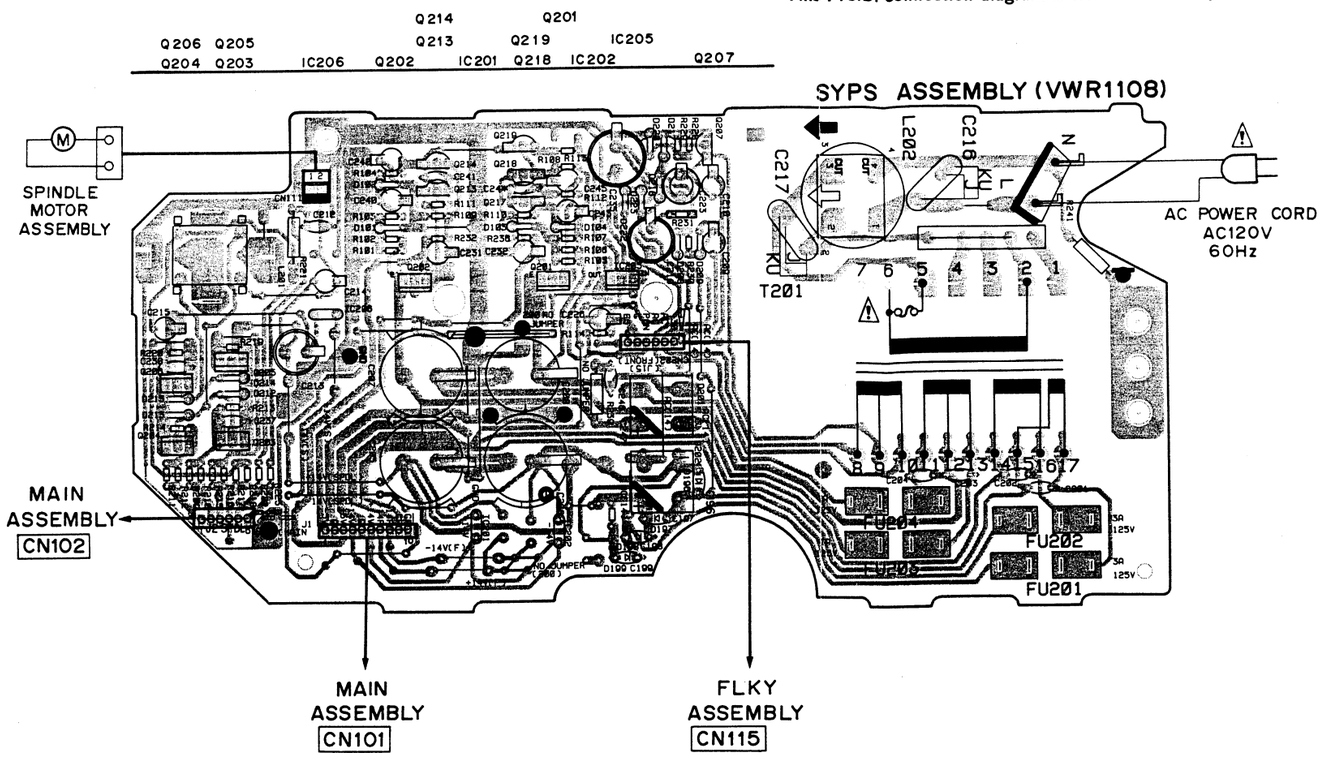
C205, C206 : VCH1095
C216, C217 : RCG-009

D101, 103 MTZJ5.6B
D102, 104 MTZJ5.1C
D201, D202 : S2VB20
D208, D209,
D216, D217 : 1SS252
D213, D214,
D222, D223 : 1SR35-100AVL
D212, D215 : 10ELS2
D220 : MTZJ27A

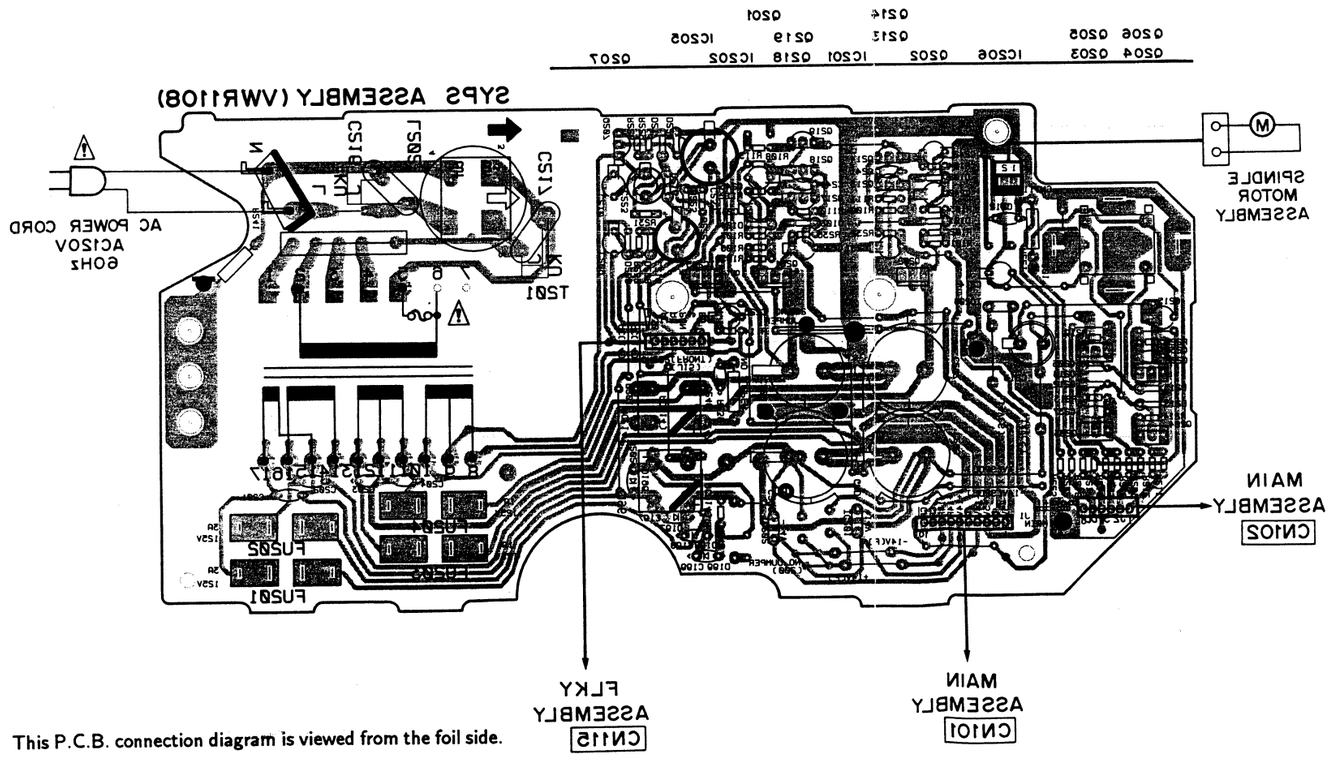
R221 : RS1LMFR51J
R239 : RS1LMF4R7J
R231 : VCN1029



This P.C.B. connection diagram is viewed from the parts mounted side.



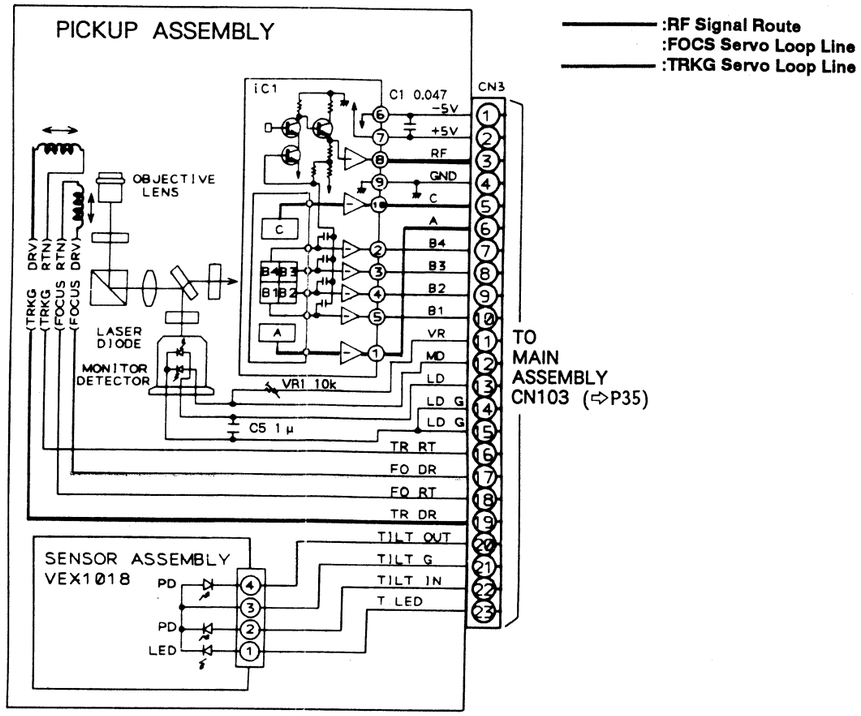
This P.C.B. connection diagram is viewed from the foil side.



P.C.B. pattern diagram indication	Corresponding part symbol	Part name
		Transistor
		FET
		Diode
		Zenner diode
		LED
		Varactor
		Tact switch
		Inductor
		Coil
		Transformer
		Filter
		Ceramic capacitor
		Mylar capacitor
		Styrol capacitor
		Electrolytic capacitor (Non polarized)
		Electrolytic capacitor (Noiseless)
		Electrolytic capacitor (Polarized)
		Electrolytic capacitor (Polarized)
		Power capacitor
		Semi-fixed resistor
		Resistor array
		Resistor
		Resonator
		Thermistor

1. This P.C.B. connection diagram is viewed from the parts mounted side.
2. The parts which have been mounted on the board can be replaced with those shown with the corresponding wiring symbols listed in the above Table.
3. The capacitor terminal marked with ▭ shows negative terminal.
4. The diode marked with O shows cathode side.
5. The transistor terminal marked with ▭ shows emitter.

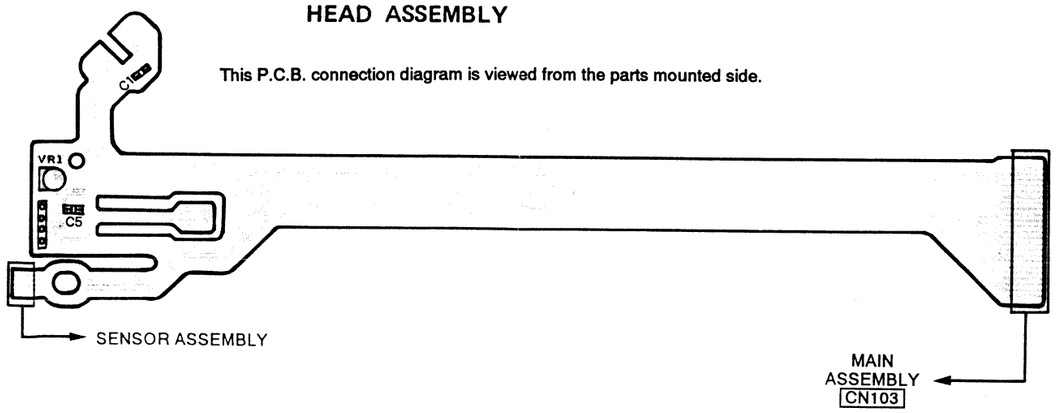
5.3 PICKUP ASSEMBLY

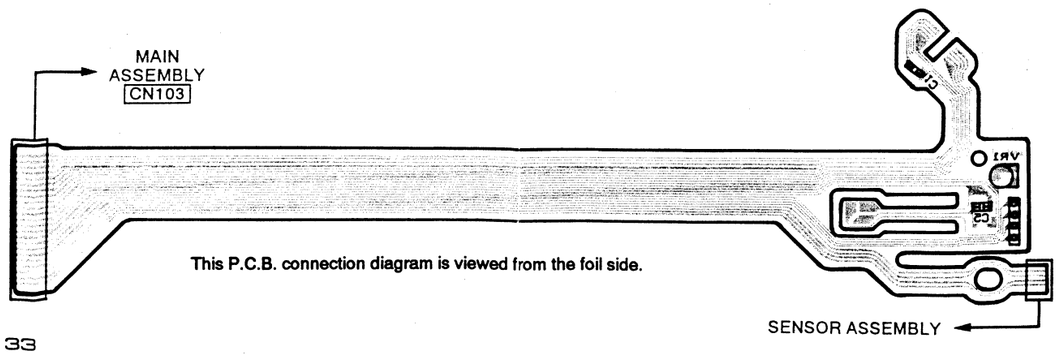


:RF Signal Route
:FOCS Servo Loop Line
:TRKG Servo Loop Line

HEAD ASSEMBLY

This P.C.B. connection diagram is viewed from the parts mounted side.





This P.C.B. connection diagram is viewed from the foil side.

FTS SECTION

IC801 (CXA1081S)			CN401			IC803 (PM3003)	Other Points
① 1.5Vp-p	⑳ 400mVp-p		① 300mVp-p	⑦ 100mVp-p		① 300mVp-p	① Q810 collector 400mVp-p
② 300mVp-p	㉑ 700mVp-p		② 5Vp-p	⑧ 1.25Vp-p :at closed		⑧ 2Vp-p	② Q809 Emitter 2Vp-p
⑦ 40mVp-p	㉒ 7Vp-p		③ 4Vp-p	⑨ 1.25Vp-p		㊱ 2Vp-p	③ Betweem C830 and C832 200mVp-p
⑫ 350mVp-p	㉓ 2Vp-p		④ 1.5Vp-p	⑩ 2Vp-p		㊴ 1Vp-p	④ Q828 collector 400mVp-p
⑮ 400mVp-p	㉗ 3Vp-p		⑤ 1.5Vp-p			㊸ 500mVp-p	
						㊼ 150mVp-p	

1. RESISTORS:
Indicated in Ω , 1/4W, 1/6W and 1/8W, ±5% tolerance unless otherwise noted k;k Ω , M;M Ω , (F); ± 1%, (G); ± 2%,(K); ± 10%, (M); ± 20% tolerance.

2. CAPACITORS:
Indicated in capacity (μF) /voltage(V)unless otherwise noted p;pF. Indication without voltage is 50V except electrolytic capacitor.

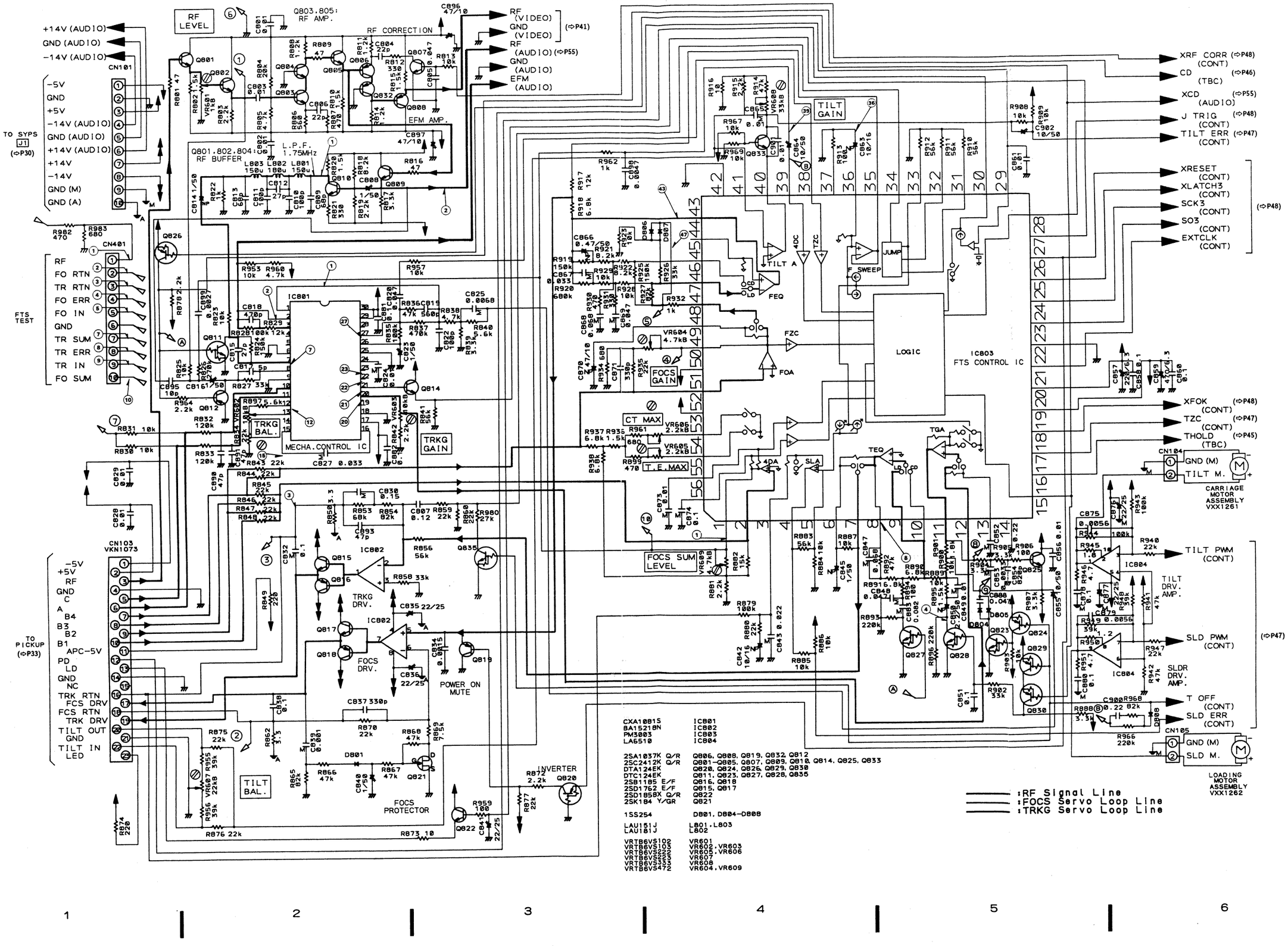
3. VOLTAGE, CURRENT:
▭ ;DC voltage (V) at no input signal.
Value in ( ) is DC voltage at rated power.
⇦mA ;DC current at no input signal.

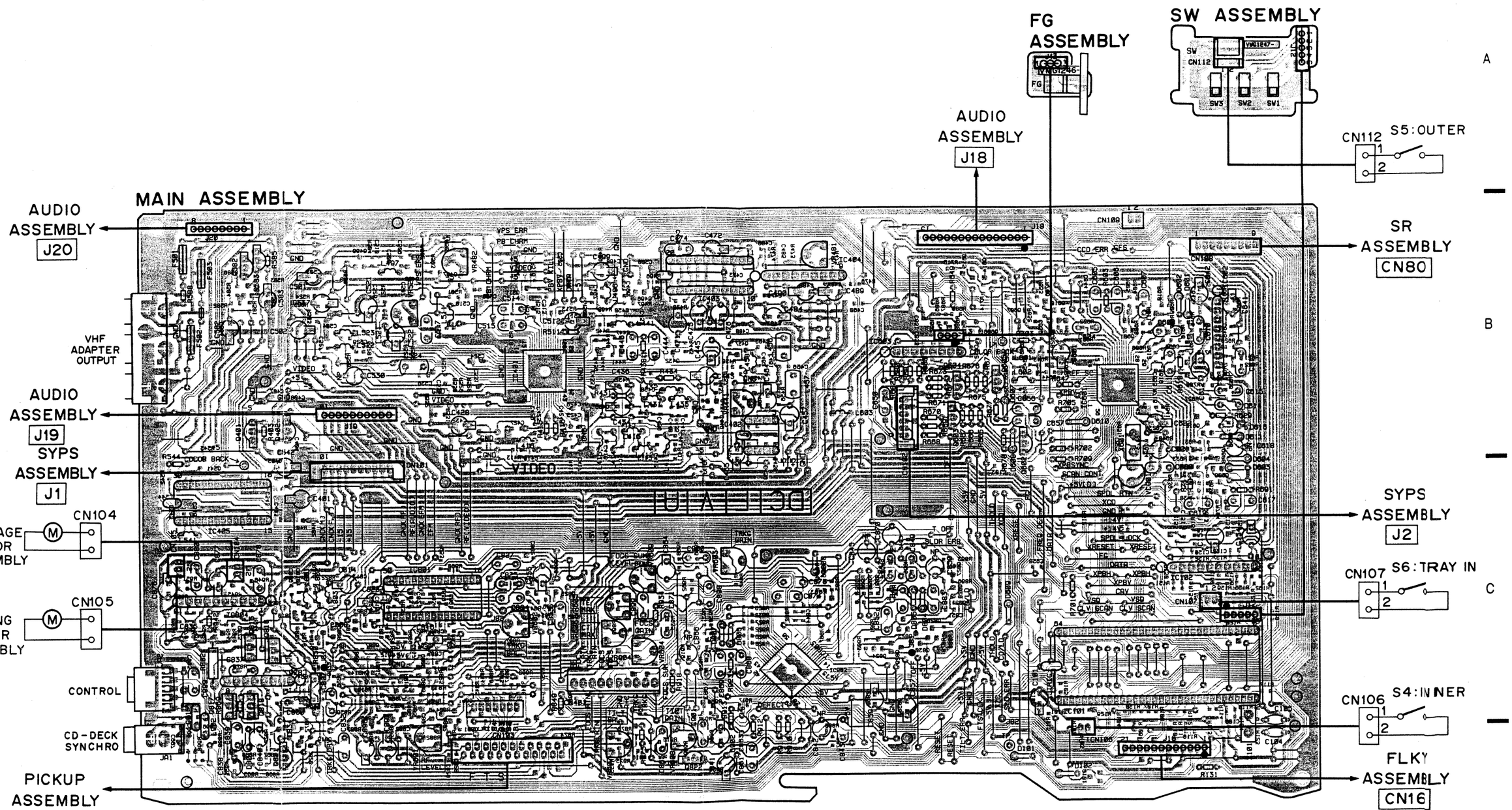
4. OTHERS:
➡ ;Signal route.
⊘ ;Adjusting point.
The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.
※ marked capacitors and resistors have parts numbers.

This is the basic schematic diagram, but the actual circuit may vary due to improvements in design.

5.4 MAIN ASSEMBLY(FTS Section)

MAIN ASSEMBLY(FTS SECTION)



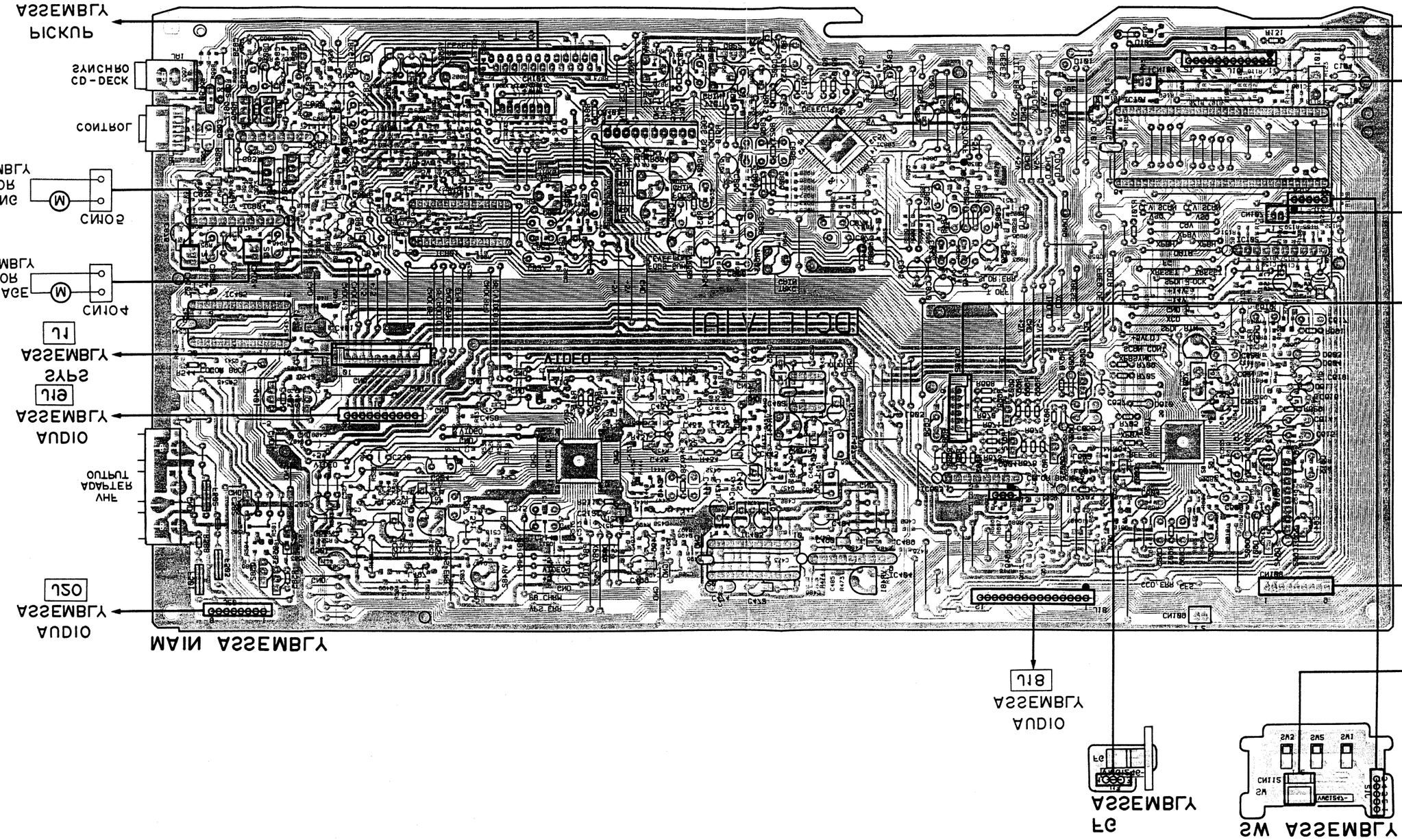


VR521 VR482 VR601 VR602 VR606 VR605 VR609 VR603 VR481 VR607 VR604 VR608 VR441 VR901

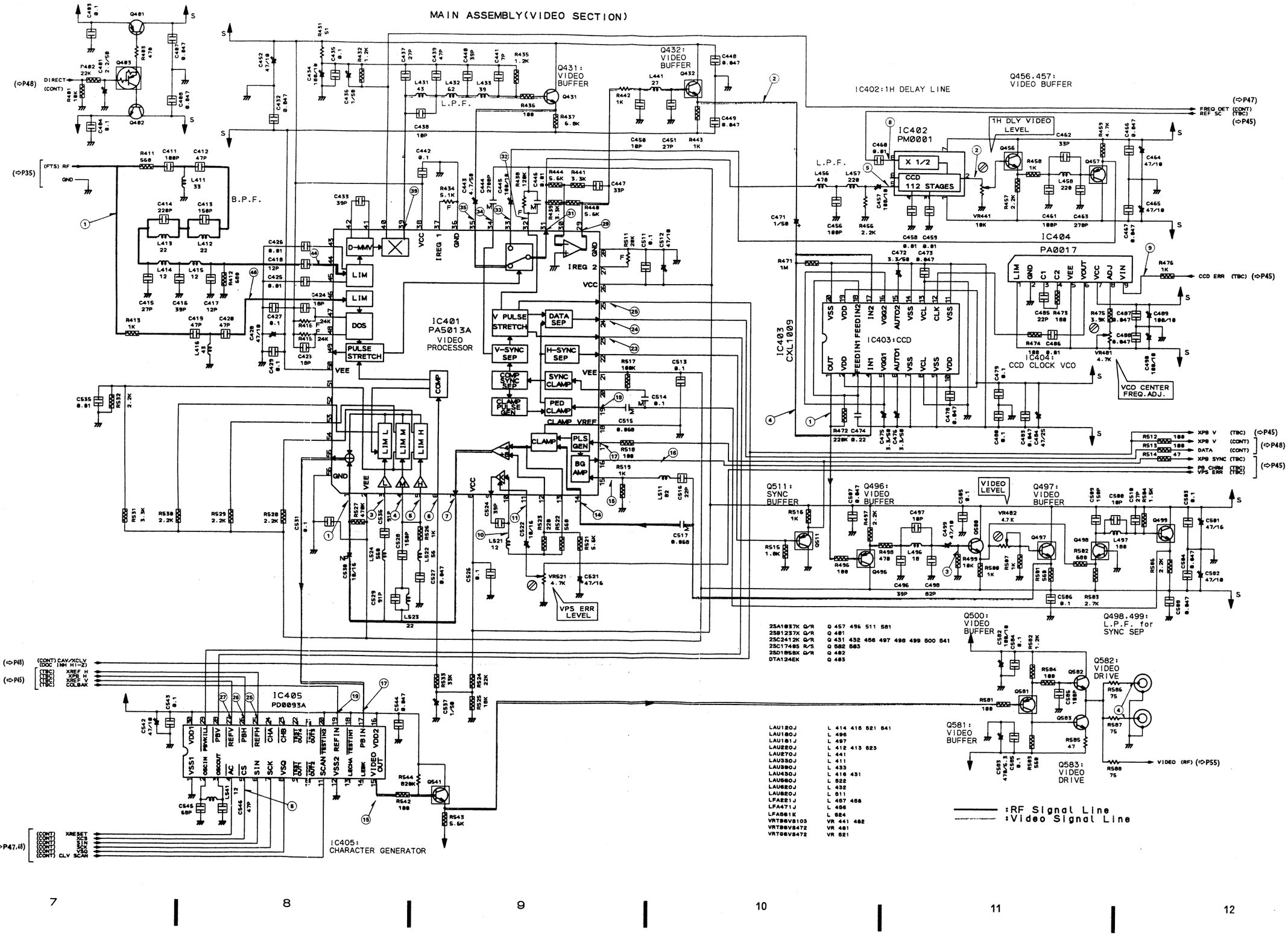
IC405 IC802 Q821 Q439 – Q437 IC801 Q211 IC401 Q200 Q436 Q822 IC402 IC404 IC804 Q582 Q583 Q832 Q814 Q825 Q833 IC403 IC803 Q401 Q402 Q807 – Q801 Q431 Q435 Q815 – Q818 Q812 – Q808 Q456 Q835 Q819 Q850 Q403 IC603 Q607 Q610 IC601 IC101 IC602 Q602 – Q605 Q853 Q601 Q101 IC102 Q606 Q856 – Q830 Q613 Q608 Q614 Q615 Q609

5.5 MAIN

This P.C.B. connection diagram is viewed from the foil side.



5.5 MAIN ASSEMBLY(VIDEO Section)



WAVEFORMS OF THE VIDEO SECTION

IC401 (PA5013A)

① 2Vp-p	⑭ 600mVp-p	㉙ 1.25Vp-p	㊻ 1Vp-p	⑨ approx. 300mVp-p	㉘ 5Vp-p
③ 2Vp-p	⑮ 200mVp-p	㉛ 700mVp-p	IC402 (PM0001)		㉗ 5Vp-p
④ approx. 1Vp-p	⑯ 63.5μS	㉜ 4Vp-p, 17.5mS	② approx. 1Vp-p	IC405 (PD0070)	
⑤ approx. 1Vp-p	⑰ 4Vp-p, 63.5μS	㉝ approx. 600mVp-p	⑤ 600mVp-p	⑤ 4Vp-p	Other Points
⑥ 2Vp-p	⑲ 2.5Vp-p	㉞ 2.5Vp-p	⑧ 0.3μS, 450mVp-p	⑮ 1.25Vp-p	① RF (R411 and R413) approx. 2Vp-p
⑦ 2Vp-p	㉓ 5Vp-p, 63.5μS	㉟ 700mVp-p	IC403 (CXL1009)	⑰ 1.25Vp-p	② Q432 Emitter approx. 1.25Vp-p
⑩ 500mVp-p	㉔ 4Vp-p	㊴ approx. 1.2Vp-p	① approx. 1.5Vp-p	⑲ 1Vp-p	③ + side of C499 1.25Vp-p
⑪ 1V/div 2mS/div	㉕ 5Vp-p	㊹ 300mVp-p, 17.5mS	④ approx. 1.5Vp-p	㉕ 5Vp-p	④ VIDEO OUT terminal 1.2Vp-p

IC404 (PA0017)

IC402 (PM0001)

IC405 (PD0070)

Other Points

IC403 (CXL1009)

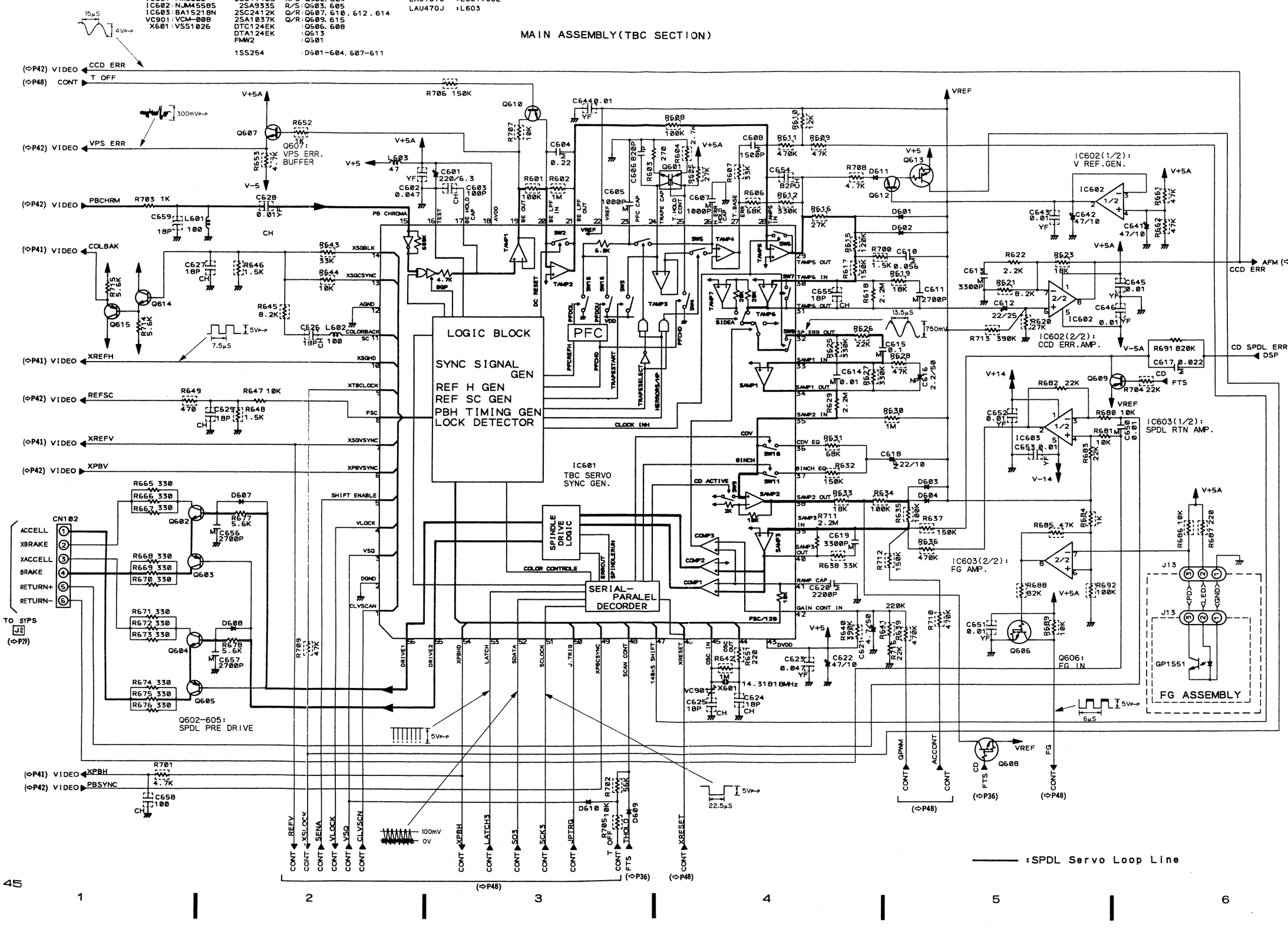
5.6 MAIN ASSEMBLY(TBC Section)

IC601 : PM3002
IC602 : NJM4558S
IC603 : BA15218N
VC901 : VCM-008
X601 : VSS1026

2SC1740S R/S : Q502, 604
2SA933S R/S : Q503, 605
2SC2412K Q/R : Q607, 610, 612, 614
2SA1037K Q/R : Q609, 615
DTC124EK : Q506, 608
DTA124EK : Q513
FMW2 : Q501
1SS254 : D501–604, 607–611

LAU101J : L601, 602
LAU470J : L603

MAIN ASSEMBLY(TBC SECTION)



5.7 MAIN ASSEMBLY(CONT Section)

MAIN ASSEMBLY(CONT SECTION)

D101-102 : 1SS254
Q101 : DTC124EK
X101 : VSS1040
IC101 : PD0104A
IC102 : LA6510

IC101: MECHA. CONTROL IC

S4:INNER DSG1014
S5:OUTER DSG1014
S6:TRAY IN RED DSG1014
SW4
SW ASSEMBLY
SW1-3 DSG1015

CN108: GND M, GND, CLUMP M, TURN M, +5V, SHIFT/LOAD, SDATA3, SCK3, CD SENSE
TO SR CN80 (⇨P59)

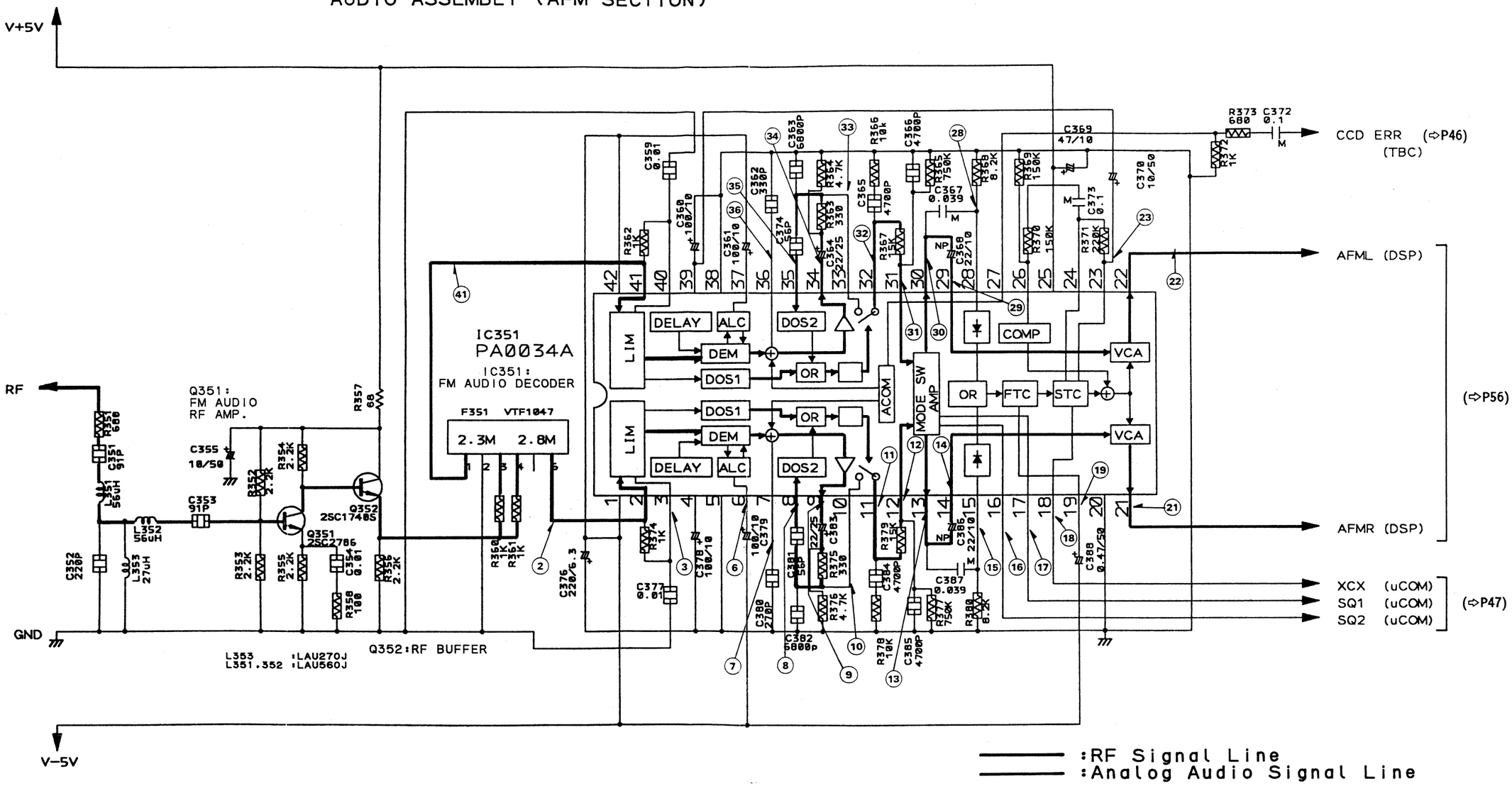
(⇨P36) FTS
(⇨P55) DSP
TBC (⇨P46, 46)
VIDEO (⇨P41:42)
FTS (⇨P36)

J16: SYNCRO IN, SYNCRO OUT, SEL IR, GND, XRESET, XCS, XSCK, SI, SO, SHAKE, IR
TO FLKY CN116 (⇨P67)

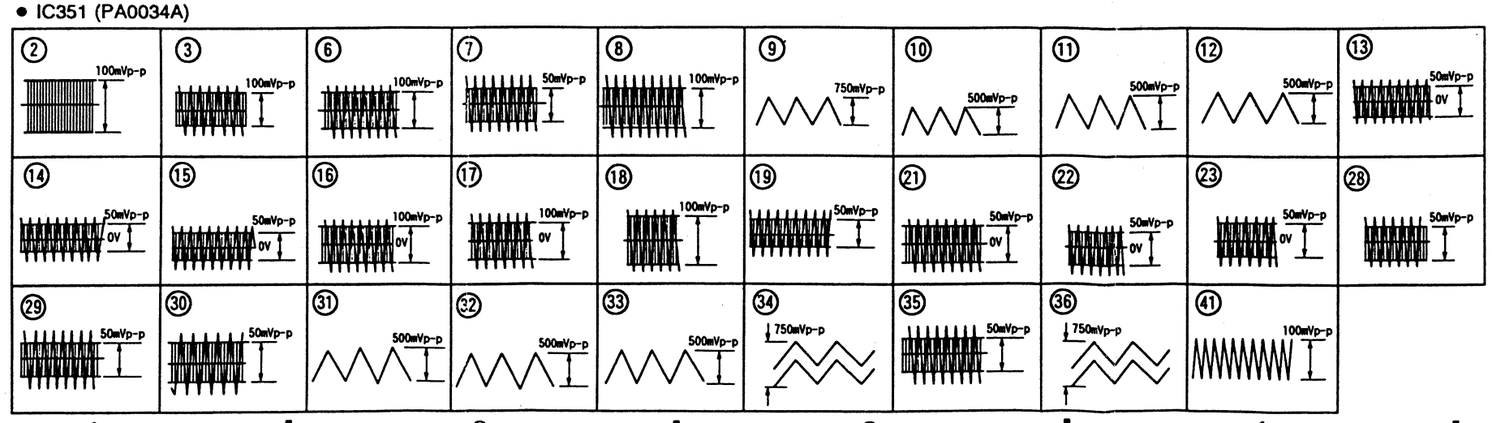
JA1 RKN1014
JA2 VKN-183
SR OUT
SR IN
SYNCRO REC
TEST
CN109
9MHz X101
Q101

5.8 AUDIO ASSEMBLY(AFM Section)

AUDIO ASSEMBLY (AFM SECTION)



● IC351 (PA0034A)

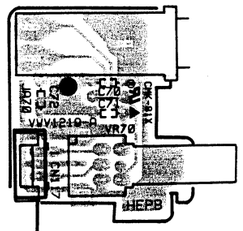


Note: Waveforms and voltages are at the PLAY state.
IC351 (PA0034A)

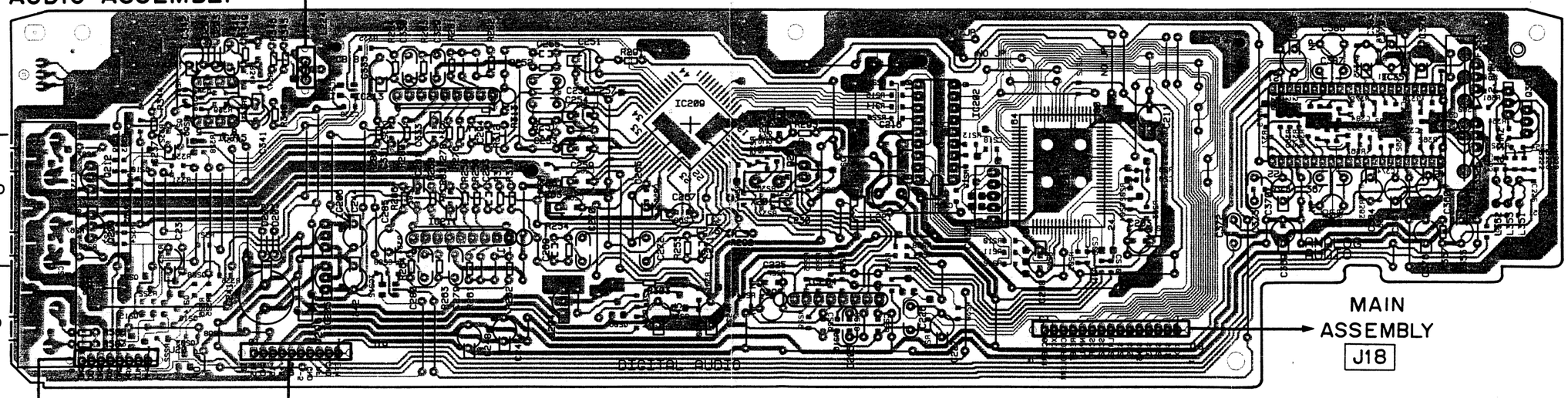
Pin No.	Voltage	Pin No.	Voltage	Pin No.	Voltage
1	- 5V	15	*	29	*
2	*	16	*	30	*
3	*	17	*	31	*
4	—	18	*	32	*
5	—	19	*	33	*
6	*	20	0	34	*
7	*	21	*	35	*
8	*	22	*	36	*
9	*	23	*	37	—
10	*	24	0	38	—
11	*	25	5V	39	—
12	*	26	0	40	—
13	*	27	0	41	*
14	*	28	*	42	- 5V

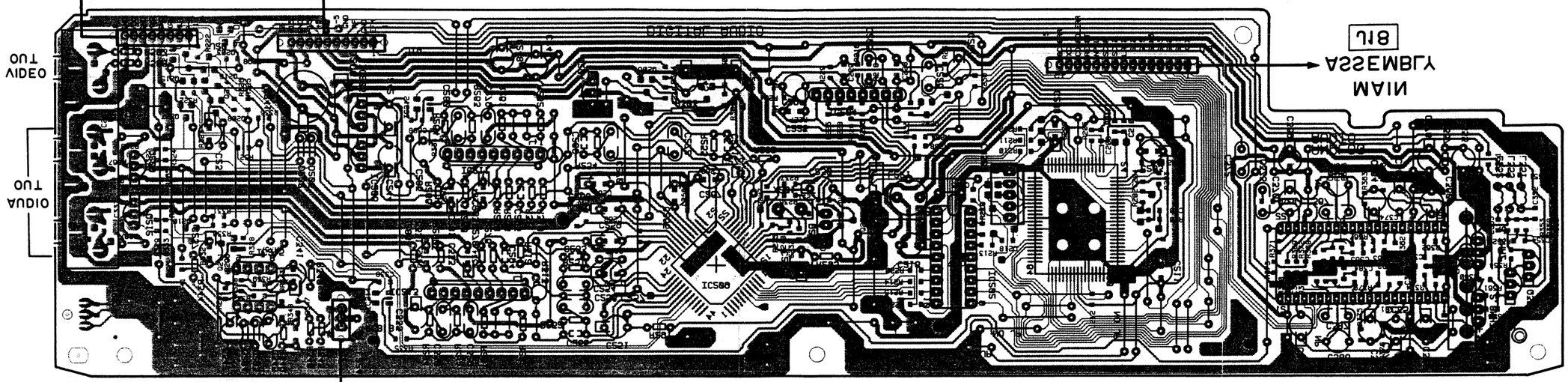
*: Refer to Waveforms

HEPB ASSEMBLY



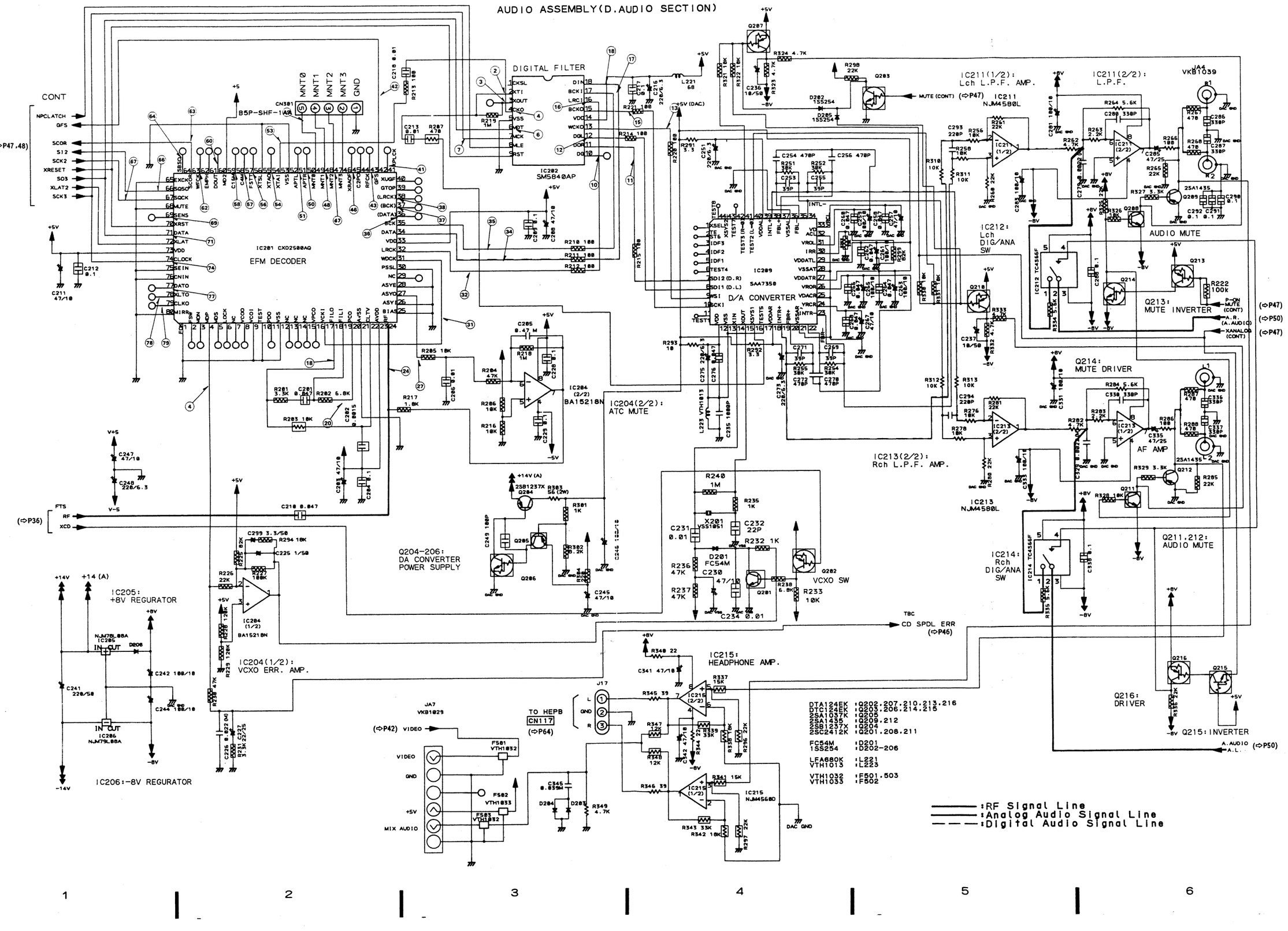
AUDIO ASSEMBLY





This P.C.B. connection diagram is viewed from the foil side.

5.9 AUDIO ASSEMBLY(Digital Audio Section)



Note: Waveforms and voltages are at the PLAY

IC201 (CXD2500AQ)

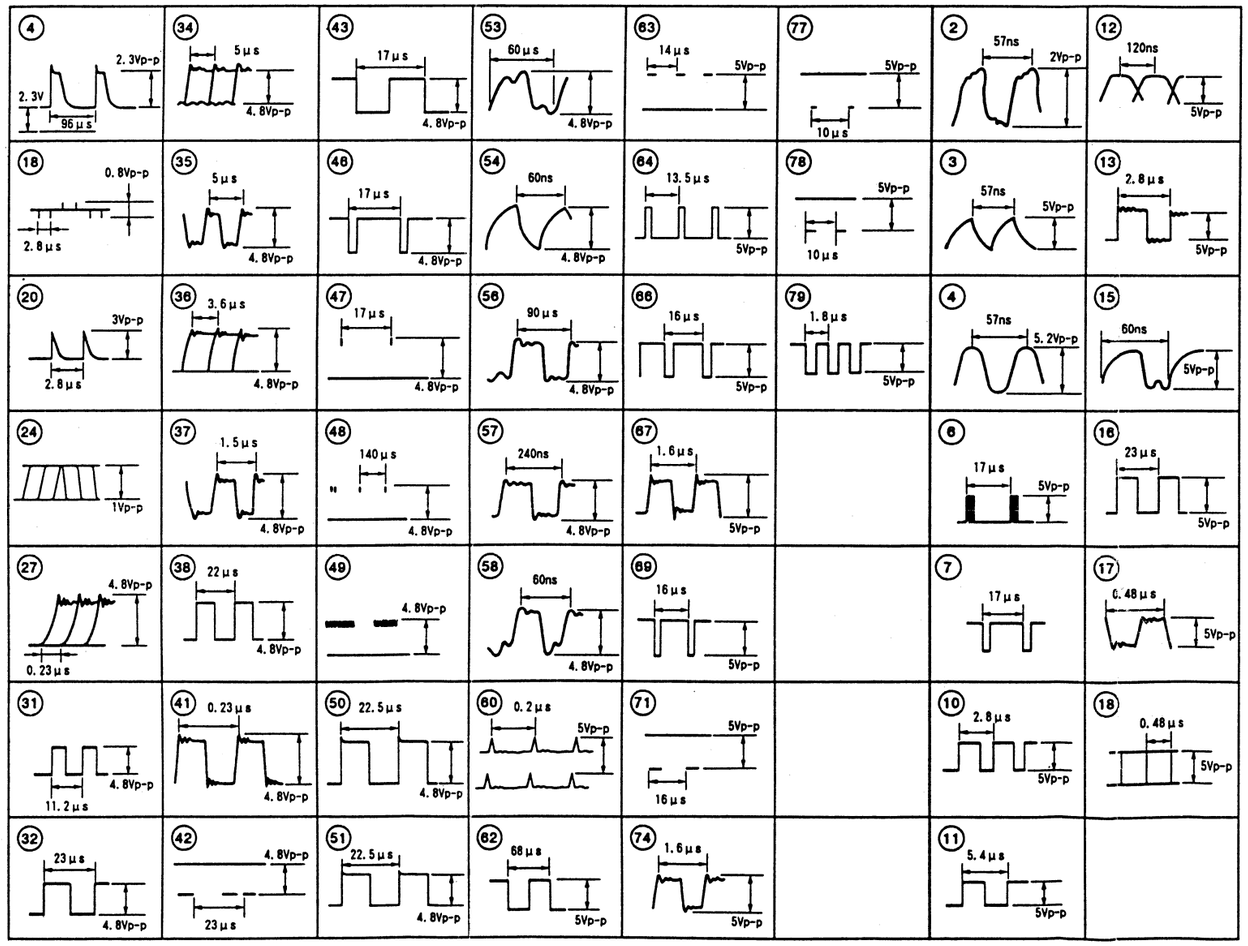
Pin No.	Voltage	Pin No.	Voltage	Pin No.	Voltage	Pin No.	Voltage	Pin No.	Voltage	Pin No.	Voltage
1	0	15	0	29	0	43	*	57	*	71	*
2	0	16	4.8	30	0	44	0	58	*	72	5
3	0	17	0	31	*	45	4.8	59	5	73	5
4	*	18	*	32	*	46	*	60	*	74	*
5	0	19	2.4	33	4.8	47	*	61	5	75	0
6	4.8	20	*	34	*	48	*	62	*	76	0
7	0	21	0	35	*	49	*	63	*	77	*
8	4.8	22	2.3	36	*	50	*	64	*	78	*
9	0	23	4.8	37	*	51	*	65	0	79	*
10	0	24	*	38	*	52	0	66	*	80	0
11	0	25	0	39	0	53	*	67	*		
12	0	26	0	40	4.8	54	*	68	0		
13	0	27	*	41	*	55	0	69	*		
14	0	28	0	42	*	56	*	70	5		

*: Refer to Waveforms

IC202 (SM5840AP)

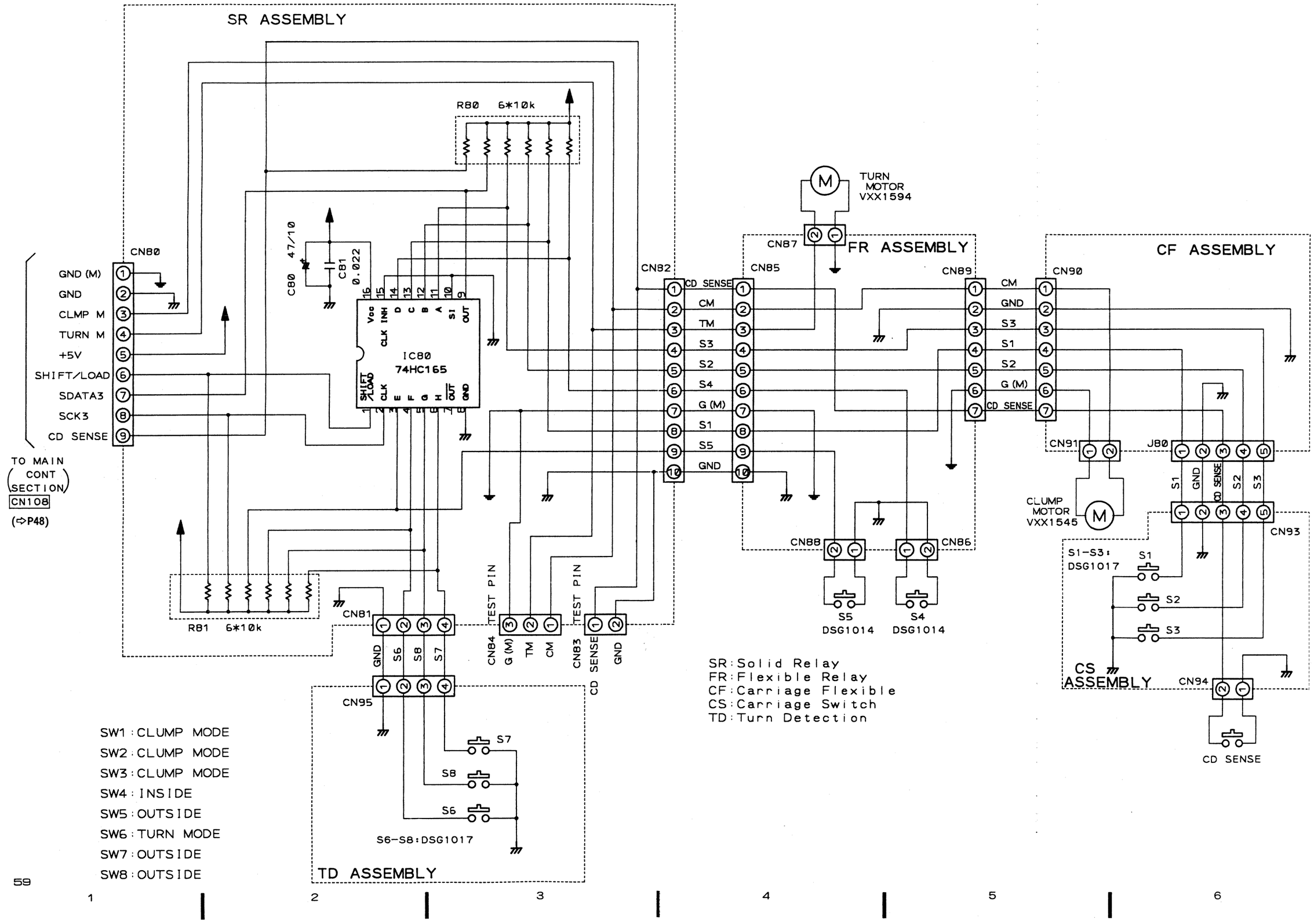
Pin No.	Voltage	Pin No.	Voltage
1	5	10	*
2	*	11	*
3	*	12	*
4	*	13	*
5	0	14	5
6	*	15	*
7	*	16	*
8	5	17	*
9	5	18	*

IC201 (CXD2500AQ)

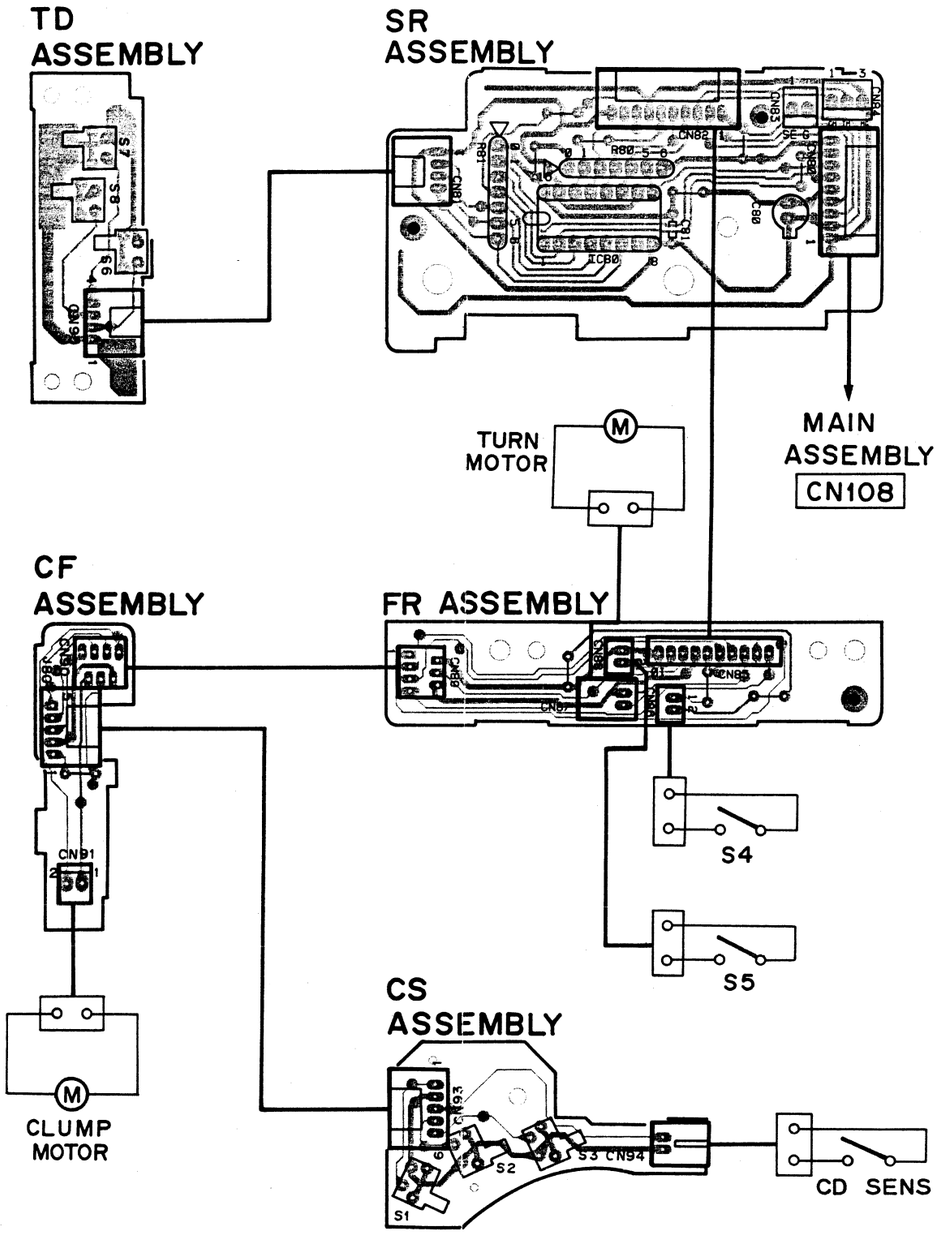


IC202 (SM5840AP)

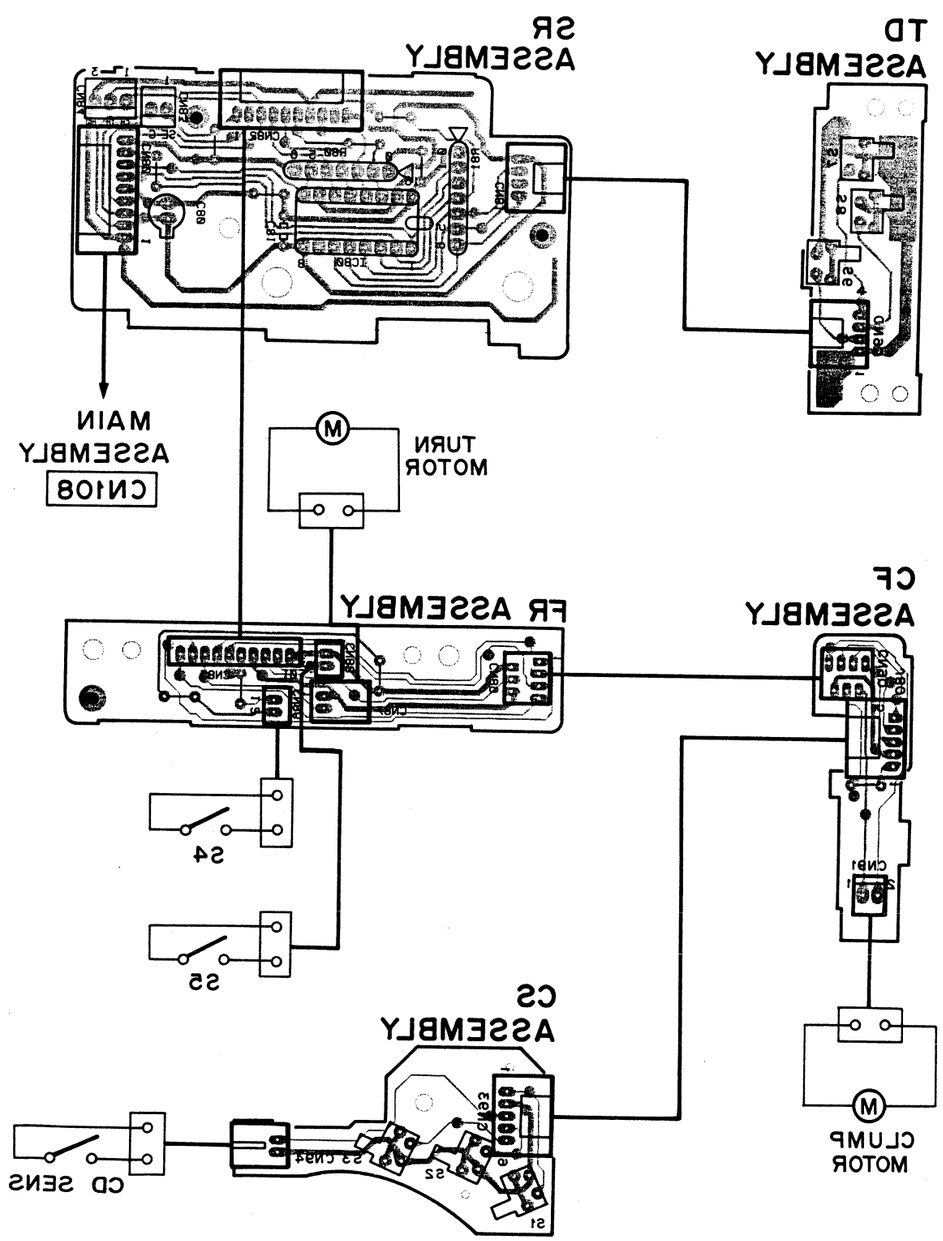
5.10 MSWB ASSEMBLY



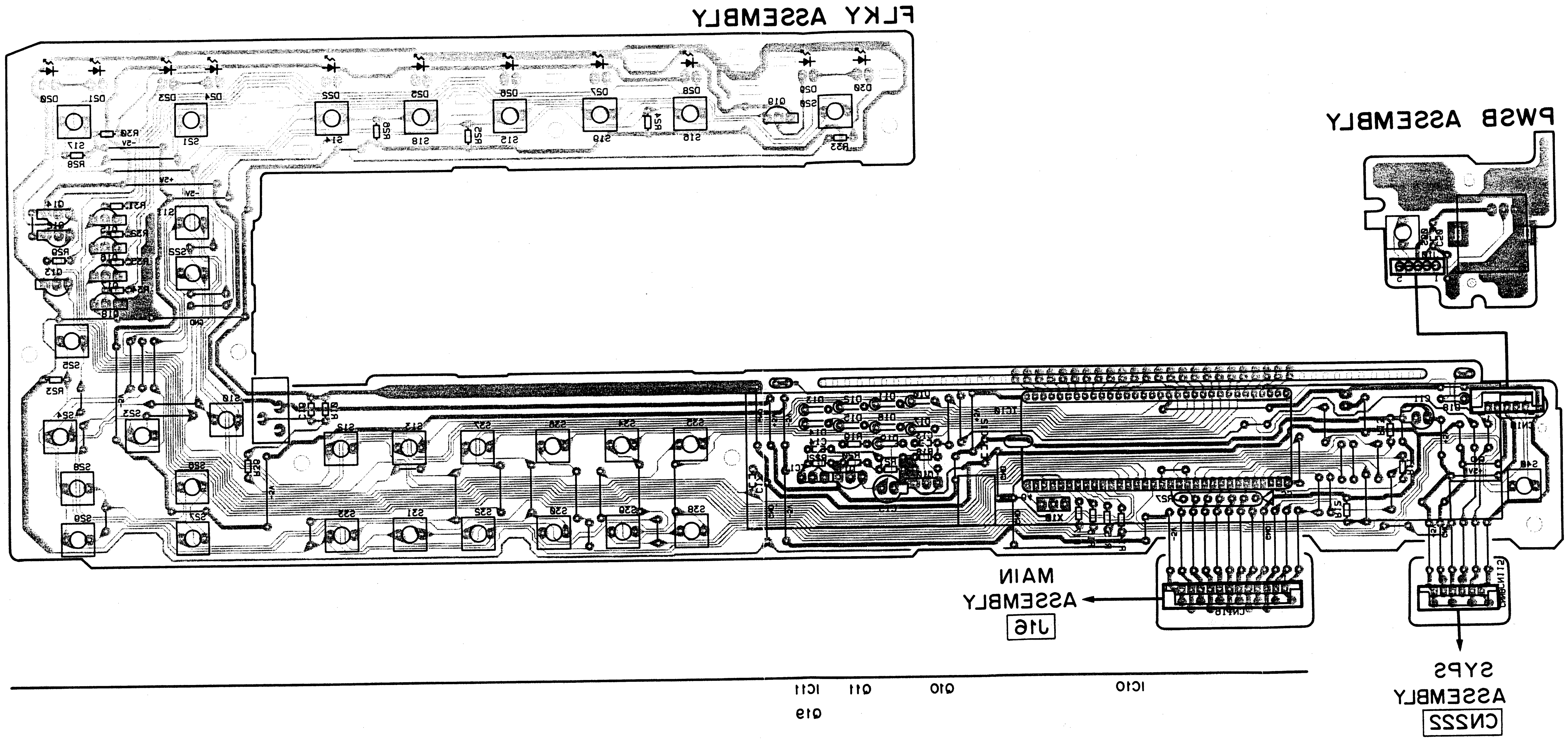
This P.C.B. connection diagram is viewed from the parts mounted side.



This P.C.B. connection diagram is viewed from the foil side.



5.11 FLKY, PSWB AND HEPB ASSEMBLIES

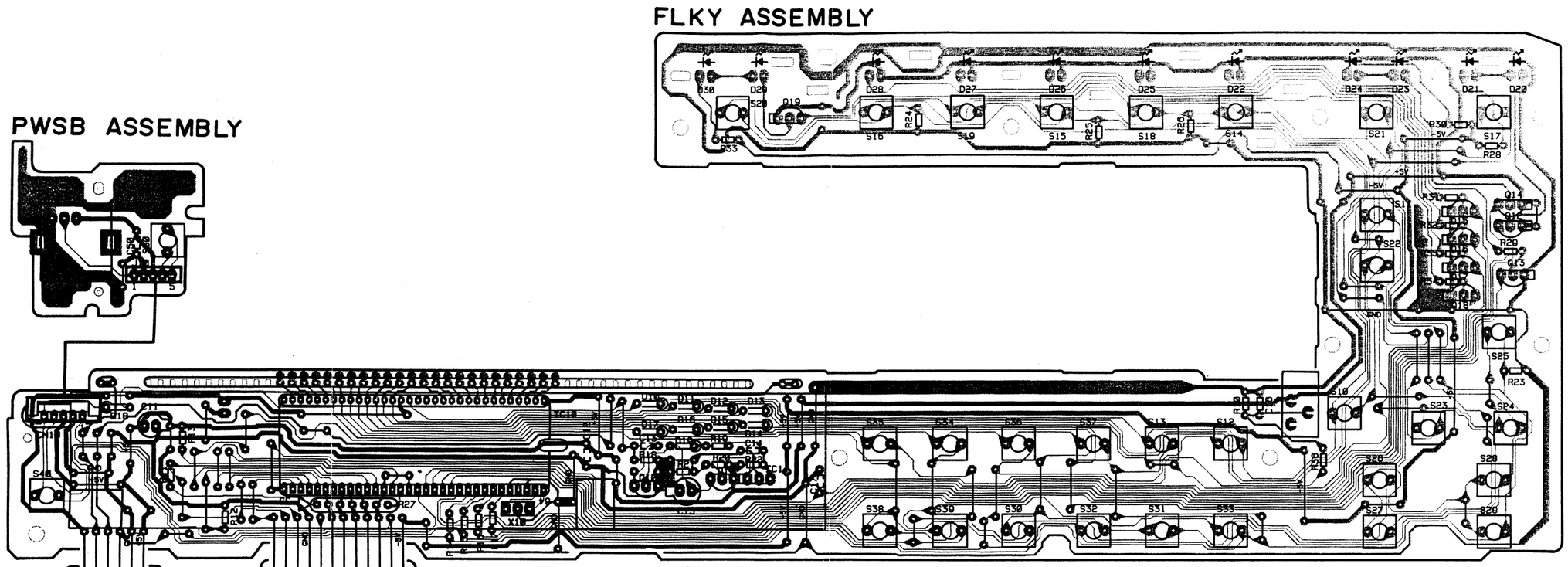


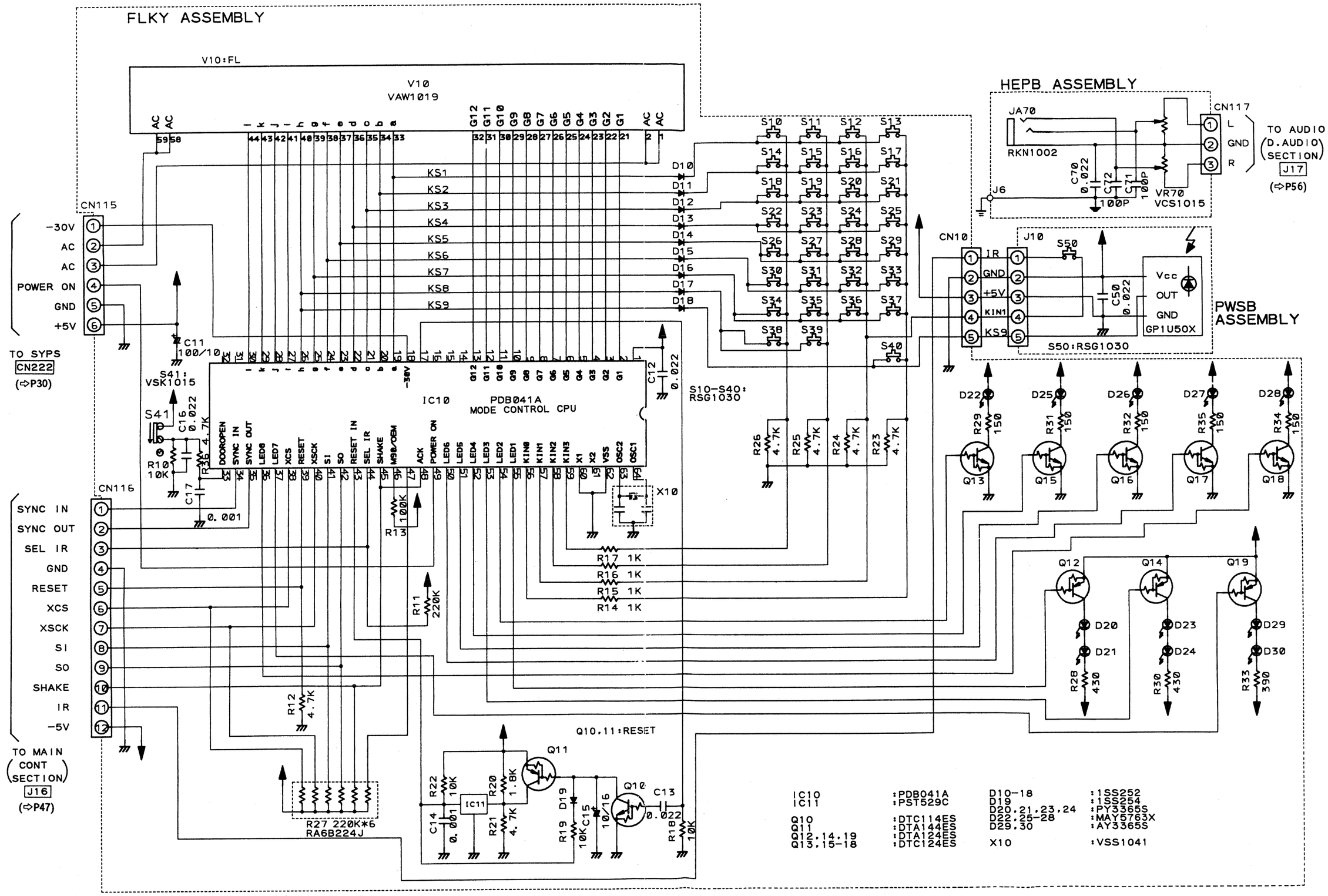
This P.C.B. connection diagram is viewed from the foil side.

5.11 FLKY, PSWB AND HEPB ASSEMBLIES

PWSB ASSEMBLY

FLKY ASSEMBLY




FLKY ASSEMBLY
V10:FL
V10
VAW1019
CN115
-30V
AC
AC
POWER ON
GND
+5V
TO SYPS
CN222
(⇨P30)
KS1
KS2
KS3
KS4
KS5
KS6
KS7
KS8
KS9
D10
D11
D12
D13
D14
D15
D16
D17
D18
S10 S11 S12 S13
S14 S15 S16 S17
S18 S19 S20 S21
S22 S23 S24 S25
S26 S27 S28 S29
S30 S31 S32 S33
S34 S35 S36 S37
S38 S39
S40
S10-S40:
RSG1030
C11
100/10
C12
0.022
IC10
PDB041A
MODE CONTROL CPU
S41:
VSK1015
S41
C16
0.022
R10
10K
R16
4.7K
C17
0.001
R13
100K
X10
R17 1K
R16 1K
R15 1K
R14 1K
R11
220K
R12
4.7K
R27 220K*6
RA6B224J
CN116
SYNC IN
SYNC OUT
SEL IR
GND
RESET
XCS
XSCK
SI
SO
SHAKE
IR
-5V
TO MAIN
CONT
SECTION
J16
(⇨P47)
Q10.11:RESET
Q11
Q10
R22
10K
R20
1.8K
R21
4.7K
R19
10K
C14
0.001
C15
10/16
C13
0.022
R18
10K
IC11
R26
4.7K
R25
4.7K
R24
4.7K
R23
4.7K
HEPB ASSEMBLY
JA70
RKN1002
CN117
L
GND
R
TO AUDIO
(D.AUDIO
SECTION)
J17
(⇨P56)
C70
0.022
C72
100P
C71
100P
VR70
VCS1015
J6
CN10
IR
GND
+5V
KIN1
KS9
J10
S50
C50
0.022
Vcc
OUT
GND
GP1U50X
S50:RSG1030
PWSB
ASSEMBLY
D22
D25
D26
D27
D28
R29
150
R31
150
R32
150
R35
150
R34
150
Q13
Q15
Q16
Q17
Q18
Q12
Q14
Q19
D20
D21
D23
D24
D29
D30
R28
430
R30
430
R33
390
IC10 :PDB041A
IC11 :PST529C
Q10 :DTC114ES
Q11 :DTA144ES
Q12.14.19 :DTA124ES
Q13.15-18 :DTC124ES
D10-18 :1SS252
D19 :1SS254
D20.21.23.24 :PY3365S
D22.25-28 :MAY5763X
D29.30 :AY3365S
X10 :VSS1041

6. ELECTRICAL PARTS LIST

NOTES :

- *Parts without part number cannot be supplied.*
- *Parts marked by "◉" are not always kept in stock. Their delivery time may be longer than usual or they may be unavailable.*
- *The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.*
- *When ordering resistors, first convert resistance values into code form as shown in the following examples.*

Ex.1 *When there are 2 effective digits (any digit apart from 0), such as 560 ohm and 47k ohm (tolerance is shown by J = 5%, and K = 10%).*

560Ω	*56 × 10¹*	*561*	*RD1/4PS 5 6 1 J*
47kΩ	*47 × 10³*	*473*	*RD1/4PS 4 7 3 J*
0.5Ω	*0R5*		*RD2H 0 R 5 K*
1Ω	*010*		*RD1P 0 1 0 K*

Ex.2 *When there are 3 effective digits (such as in high precision metal film resistors).*

5.62kΩ	*562 × 10¹*	*5621*	*RD1/4SR 5 6 2 1 F*

Miscellaneous Parts

Mark	No.	Description	Parts No.
◉		Mother assembly	VWM1198
		├── MAIN assembly	
		├── FG assembly	
		├── SW assembly	
		└── AUDIO assembly	
◉		SYPS assembly	VWR1108
◉		FLKB assembly	VWM1199
		├── FLKY assembly	
		├── PSWB assembly	
		└── HEPB assembly	
		MSWB assembly	
		├── SR assembly	
		├── FR assembly	
		├── CF assembly	
		├── CS assembly	
		└── TD assembly	
⚠		FU201, 202 Fuse (3A)	VEK-018
⚠		FU203, 204 Fuse (1A)	REK-080
⚠		Power transformer	VTT1096
⚠		Strain relief	CM-22C
⚠		AC power cord	PDG1015
		S4, S5 Push switch (INNER, OUTER)	DSG1014
		S6 Push switch (TRAY IN)	DSG1014
		Carriage motor assembly	VXX1261
		Loading motor assembly	VXX1262
		Spindle motor assembly	VXA1474
		Pre-pickup assembly	VXX1413
◉		Servo mechanism base assembly-S	VXX1583

◉MOTHER ASSEMBLY (VWM1198)

MOTHER assembly is composed of the MAIN, FG, SW and AUDIO assemblies.

MAIN ASSEMBLY

SEMICONDUCTORS

Mark	No.	Description	Parts No.
		IC603,IC802	BA15218N
		IC801	CXA1081S
		IC403	CXL1009P
		IC102,IC804	LA6510
		IC602	NJM4558S
		IC404	PA0017
		IC401	PA5013A
		IC405	PD0093A
		IC101	PD0104A
		IC402	PM0001
		IC601	PM3002
		IC803	PM3003
		Q403,Q613,Q820,Q824,Q826,Q829, Q830	DTA124EK
		Q101,Q606,Q608,Q811,Q823,Q827, Q828,Q835	DTC124EK
		Q601	FMW2
		Q457,Q496,Q511,Q581,Q609,Q615, Q806,Q808,Q812,Q819.Q832	2SA1037K
		Q603,Q605	2SA933S
		Q816,Q818	2SB1185
		Q401	2SB1237X
		Q582,Q583,Q602,Q604	2SC1740S
		Q431,Q432,Q456,Q497-Q500,Q541, Q607,Q610,Q612,Q614,Q801-Q805, Q807,Q809,Q810,Q814,Q825,Q833	2SC2412K
		Q815,Q817	2SD1762
		Q402,Q822	2SD1858X
		Q821	2SK184
		D101,D102,D601-D604,D607-D611, D801,D804-D808	1SS254

COILS AND FILTERS

Mark	No.	Description	Parts No.
		L601,L602	LAU101J
		L414,L415,L521,L541	LAU120J
		L801,L803	LAU151J
		L496	LAU180J
		L497,L802	LAU181J
		L412,L413,L523	LAU220J
		L441	LAU270J
		L411	LAU330J
		L433	LAU390J
		L416,L431	LAU430J
		L603	LAU470J
		L522	LAU560J
		L432	LAU620J
		L511	LAU820J
		L457,L458	LFA221J
		L456	LFA471J
		L524	LFA561K
		L901,L902 Ferrite beads	VTH1015
		F351 BPF(2.30, 2.81MHZ)	VTF1047
		F501,F503	VTH1032
		F502	VTH1033

CAPACITORS

Mark	No.	Description	Parts No.
		VC901 Ceramic trimmer (20P)	VCM-008
		C104,C105	CCCCH300J50
		C837,C871	CCCSL331J50
		C817	CCSQCH050C50
		C441	CCSQCH070D50
		C438,C450,C497,C500,C895	CCSQCH100D50
		C411,C456,C461,C586,C603,C658, C810,C811,C822,C995,C996	CCSQCH101J50
		C417,C418	CCSQCH120J50
		C413,C509,C528	CCSQCH151J50
		C423,C424,C624-C627,C629,C655, C659	CCSQCH180J50
		C485,C516,C806	CCSQCH220J50
		C414	CCSQCH221J50
		C415,C437,C451,C510,C812,C815	CCSQCH270J50
		C463	CCSQCH271J50
		C447,C462	CCSQCH330J50
		C416,C433,C440,C496,C524,C804	CCSQCH390J50
		C412,C419,C420,C439,C546,C890, C891,C893	CCSQCH470J50
		C545,C809,C813	CCSQCH680J50
		C498,C654	CCSQCH820J50
		C529,C536	CCSQCH910J50
		C818	CCSQSL471J50
		C819	CCSQSL561J50
		C530	CEALNP100M16
		C537	CEAL010M50
		C522	CEAL100M16
		C401	CEAL2R2M50
		C501,C521	CEAL470M16
		C866	CEANPR47M50
		C863	CEANP100M16
		C616,C850	CEANP2R2M50
		C618	CEANP220M10
		C870	CEANP470M10
		C436,C471,C808,C814,C816,C823, C840	CEAS010M50
		C855,C864,C902	CEAS100M50
		C101,C434,C445,C457,C489,C490, C582	CEAS101M10
		C612,C835,C836,C841,C876,C877	CEAS220M25
		C601,C857,C859	CEAS221M6R3
		C472,C475,C476	CEAS3R3M50
		C443,C621	CEAS4R7M50
		C428,C464,C465,C499,C502,C512, C542,C622,C641,C642,C896,C897	CEAS470M10
		C154,C155,C484	CEAS470M25
		C583	CEAS471M6R3
		C842,C845	CEJANP100M16
		C446,C614,C650,C824,C849,C861, C865,C873,C901	CFTXA103J50
		C615,C832,C838,C874,C878,C880	CFTXA104J50
		C514	CFTNA104J50
		C807	CFTXA124J50
		C830	CFTNA154J50
		C617,C843	CFTXA223J50
		C474,C604,C852,C900	CFTXA224J50
		C827,C867	CFTXA333J50
		C848,C869,C888	CFTXA473J50
		C610	CFTXA563J50
		C517,C847,C868	CFTXA683J50
		C883	CFTXA823J50
		C999	CKCYF103Z50
		C515	CFTNA683J50
		C875,C879	CKSQYB562K50
		C854,C998	CKSQYB821K50
		C103,C106,C150,C152,C425,C426, C458-C460,C486,C535,C628, C643-C646,C651-C653,C801-C803, C828,C829,C856	CKSQYF103Z50
		C151,C153,C403,C404,C427,C429, C435,C442,C479,C480,C503,C505, C506,C511,C513,C526,C531,C543, C584,C585,C851,C858,C860,C881, C882	CKSQYF104Z25

Mark	No.	Description	Parts No.
	C102,C407,C408,C432,C448,C449, C466,C467,C473,C478,C483,C487, C488,C504,C507,C508,C527,C544, C602,C623,C805,C820,C997		CKSQYF473Z25
	C605,C607,C839		CQMA102J50
	C608,C834		CQMA152J50
	C620		CQMA222J50
	C444,C611,C656,C657,C899		CQMA272J50
	C613,C619,C853		CQMA332J50
	C898		CQMA472J50
	C825		CQMA682J50
	C606		CQPA821J100

RESISTORS

Mark	No.	Description	Parts No.
	VR601	Semi-fixed(1KΩ)	VRTB6VS102
	VR441,VR482,VR602,VR603	Semi-fixed(10KΩ)	VRTB6VS103
	VR605,VR606	Semi-fixed(2.2KΩ)	VRTB6VS222
	VR607	Semi-fixed(22KΩ)	VRTB6VS223
	VR608	Semi-fixed(33KΩ)	VRTB6VS333
	VR481,VR604,VR609	Semi-fixed(4.7KΩ)	VRTB6VS472
	VR521	Semi-fixed(4.7KΩ)	VRTG6VS472
	R131,R403,R431,R544,R585,R588, R603,R618,R629,R647,R649,R665, R666-R678,R691,R701-R703,R705, R709,R711,R849,R869,R873,R904, R910-R913,R918,R923,R934,R942		RD1/6PM□□□J
	R415,R416,R434,R438,R511,R680, R681-R683		RN1/6PQ□□□□F
	R850,R862		RS1LMF3R3J
	Other resistors		RS1/10S□□□J

OTHERS

Mark	No.	Description	Parts No.
	X601	Crystal resonator (14,318MHz)	VSS1026
	X101	Ceramic resonator (9,00MHz)	VSS1040
	CN301	5P top post	B5P-SHF-1AA
	CN103	23P top connector	VKN1073
	JA1	Mini jack (CD-DECK SYNCHRO)	RKN1014
	JA7	RF pin jack (VHF ADAPTER OUTPUT)	VKB1029
	JA2	2P mini jack (CONTROL)	VKN-183

FG ASSEMBLY

SEMICONDUCTOR

Mark	No.	Description	Parts No.
		Photo interrupter	GP1S51

SW ASSEMBLY

SWITCHES

Mark	No.	Description	Parts No.
	S1-S3	Push switch (LOADING/TILT)	DSG1015

AUDIO ASSEMBLY

SEMICONDUCTORS

Mark	No.	Description	Parts No.
	IC204		BA15218N
	IC201		CXD2500AQ
	IC215		NJM4560D
	IC211,IC213		NJM4580L
	IC205		NJM78L08A
	IC206		NJM79L08A
	IC351		PA0034A
	IC209		SAA7350
	IC202		SM5840AP
	IC212,IC214		TC4S66F
	Q202,Q207,Q210,Q213,Q216		DTA124EK
	Q203,Q206,Q214,Q215		DTC124EK
	Q205		2SA1037K
	Q209,Q212		2SA1435
	Q204		2SB1237X
	Q352		2SC1740S
	Q201,Q208,Q211		2SC2412K
	Q351		2SC2786
	D201		FC54M
	D202-D206		1SS254

COILS AND FILTERS

Mark	No.	Description	Parts No.
	L353		LAU270J
	L351,L352		LAU560J
	L221		LFA680K
	L223	Ferrite beads	VTH1013
	L232, L233		LAU180J
	F351	BPF(2.30, 2.81MHz)	VTF1047

CAPACITORS

Mark	No.	Description	Parts No.
	C253,C255,C269,C271		CCPU1L390J50
	C249		CCSQCH101J50
	C232		CCSQCH220J50
	C352		CCSQCH221J50
	C380		CCSQCH271J50
	C374,C381		CCSQCH560J50
	C351,C353		CCSQCH910J50
	C286,C287,C336,C337,C362		CCSQ1L331J50
	C225		CEANP010M50
	C368,C386		CEANP220M10

Mark	No.	Description	Parts No.
	C299		CEANP3R3M50
	C388		CEASR47M50
	C236,C237,C355,C370		CEAS100M50
	C242,C244,C246,C259,C261,C263, C265,C281,C283,C331,C333,C360, C361,C378,C379		CEAS101M10
	C227,C364,C383		CEAS220M25
	C241		CEAS221M50
	C216,C248,C251,C273,C275,C376		CEAS221M6R3
	C203,C208,C211,C230,C245,C247, C257,C267,C341,C342,C369		CEAS470M10
	C285,C335		CEAS470M25
	C372,C373		CFTNA104J50
	C226		CFTXA223J50
	C345,C367,C387		CFTXA393J50
	C205		CFTNA474J50
	C279,C329		CFTXA222J50
	C254,C256,C270,C272		CFTXA471J50
	C293,C294		CKPUYB221K50
	C280,C330		CCCSL331J50
	C202		CKSQYB152K50
	C365,C366,C384,C385		CKSQYB472K50
	C363,C382		CKSQYB682K50
	C206,C213,C218,C231,C234,C354 C359,C377		CKSQYF103Z50
	C204,C209,C212,C217,C228,C229 C288,C290-C292,C338		CKSQYF104Z25
	C201,C210,C258,C260,C262,C264, C266,C268,C276		CKSQYF473Z25
	C235		CQMA102J50

RESISTORS

Mark	No.	Description	Parts No.
	R251,R252,R254-R256,R258,R260, R261-R264,R266,R276,R278,R280, R281-R284,R286,R293,R310, R311-R313,R340,R344-R346,R349, R357,R586,R587		RD1/6PM□□□J
	R303		RS2LMF560J
	Other resistors		RS1/10S□□□J

OTHERS

Mark	No.	Description	Parts No.
	X201	Crystal resonator (16MHz)	VSS1051
	CN301	5P top post	B5P-SHF-1AA
	JA4	6P pin jack (AUDIO, VIDEO OUT)	VKB1039

◉FLKB ASSEMBLY (VWM1199)

FLKB assembly is composed of the FLKY, PSWB, and HEPB assemblies.

FLKY ASSEMBLY

SEMICONDUCTORS

Mark	No.	Description	Parts No.
	IC10		PDB041A
	IC11		PST529C
	Q12,Q14,Q19		DTA124ES
	Q11		DTA144ES
	Q10		DTC114ES
	Q13,Q15-Q18		DTC124ES
	D29,D30		AY3365S
	D22,D25-D28		MAY5763X
	D20,D21,D23,D24		PY3365S
	D10-D18		1SS252
	D19		1SS254

SWITCHES

Mark	No.	Description	Parts No.
	S10-S40	Tact switch	RSG1030
		DISPLAY,OPEN/CLOSE,PGM,DISC NUMBER,DIRECT SEARCH(0-9,+10) HILITE,DIRECT CD,RANDOM,STOP (■), EDIT,ADLC,PLAY/PAUSE (▶/❚❚) SKIP(⏮, ⏭),SCAN(◀◀, ▶▶),POWER	
	S41	Door switch	VSK1015

CAPACITORS

Mark	No.	Description	Parts No.
	C11		CEAL101M6R3
	C15		CEAL100M16
	C14,C17		CKPUYB102K50
	C12,C13,C16		CKPUYF223Z25

RESISTORS

Mark	No.	Description	Parts No.
	R27		RA6S224J
	Other resistors		RD1/6PM□□□J

OTHERS

Mark	No.	Description	Parts No.
	V10	Fluorescent indicator tube	VAW1019
	X10	Ceramic resonator (6.00MHz)	VSS1041
	FL spacer		VEB1125

PSWB ASSEMBLY

SWITCH

Mark	No.	Description	Parts No.
	S50	Tact switch (POWER)	RSG1030

CAPACITORS

Mark	No.	Description	Parts No.
	C50		CKPUYF223Z25

OTHERS

Mark	No.	Description	Parts No.
	Remote control sensor unit		GP1U50X

HEPB ASSEMBLY

CAPACITORS

Mark	No.	Description	Parts No.
	C71,C72		CKPUYB101K50
	C70		CKPUYF223Z25

RESISTOR

Mark	No.	Description	Parts No.
	VR70	Double rotary volume (LEVEL)	VCS1015

OTHERS

Mark	No.	Description	Parts No.
	JA70	Headphone jack	RKN1002

◉SYPS ASSEMBLY (VWR1108)

SEMICONDUCTORS

Mark	No.	Description	Parts No.
⚠	IC201		ICP-N15
	IC202		ICP-N15
	IC206		ICP-N25
⚠	IC205		NJM78M05FA
	Q217		DTA114ES
	Q213		DTC114ES
	Q214, Q219		2SA933S
	Q202, Q203, Q205		2SB1185
⚠	Q207		2SB1238X
	Q218		2SC1740S
	Q201,Q204,Q206		2SD1762
	D220		MTZJ27A
	D102,D104		MTZJ5.1C
	D101,D103		MTZJ5.6B
⚠	D201,D202		S2VB20
⚠	D213,D214		1SR35-100AVL
	D222,D223		1SR35-100AVL
	D208,D209		1SS252
⚠	D216,D217		1SS252
	D212,D215		10ELS2

COIL

Mark	No.	Description	Parts No.
⚠	L202	Line filter	VTL-157
⚠	L201	Coil (10mH)	VTL1008

CAPACITORS

Mark	No.	Description	Parts No.
	C226,C231,C232,C242,C245		CEAS101M10
	C235		CEAS102M25
	C214,C215		CEAS2R2M50
	C209,C210		CEAS220M25
	C240,C243		CEAS221M10
	C223		CEAS221M25
	C219		CEAS221M50
	C213		CEAS471M35
	C208		CEAS472M10
	C207		CEAS682M10
	C212,C237,C238		CGCYX473M25
	C196-C199,C246		CKCYF103Z50
	C241,C244		CKPUYB102K50
	C201-C204		CKPUYF103Z25
⚠	C216		RCG-009
	C217		RCG-009
	C205,C206 (3,300μ/25)		VCH1095

RESISTORS

Mark	No.	Description	Parts No.
	R241		RD1/2PM225J
⚠	R221		RS1LMFR51J
	R239		RS1LMF4R7J
	R231		VCN1029
	Other resistors		RD1/6PM□□□J

MSWB ASSEMBLY

MSWB assembly is composed of the SR, FR, CF, CS and TD assemblies.

SR ASSEMBLY

SEMICONDUCTOR

Mark	No.	Description	Parts No.
	IC80		HD74HC165P

CAPACITORS

Mark	No.	Description	Parts No.
	C80		CEAL470M6R3
	C81		CKPUYF223Z25

RESISTORS

Mark	No.	Description	Parts No.
	R80,R81		RA6S103J

FR ASSEMBLY

OTHER

Mark	No.	Description	Parts No.
	CN89	7P side connector	VKN1156

CF ASSEMBLY

OTHER

Mark	No.	Description	Parts No.
	CN90	7P side connector	VKN1156

CS ASSEMBLY

SWITCHES

Mark	No.	Description	Parts No.
	S1-S3	Push switch (CLUMP MODE)	DSG1017

TD ASSEMBLY

SWITCHES

Mark	No.	Description	Parts No.
	S6-S8	Push switch (TURN MODE, OUTSIDE)	DSG1017

HEAD ASSEMBLY

CAPACITOR

Mark	No.	Description	Parts No.
	C1		CKSQYF473Z50
	C5		CKSYF105Z16

RESISTORS

Mark	No.	Description	Parts No.
	VR1(10K)		VCP1040

7. DISASSEMBLY

7.1 REMOVING THE BONNET AND FRONT PANEL (Fig. 7-1, 2)

① Remove six screws Ⓐ to remove the bonnet.
② To remove the front panel assembly, remove three screws Ⓑ and lift the claws as shown in the figure and lower the front panel toward the front.

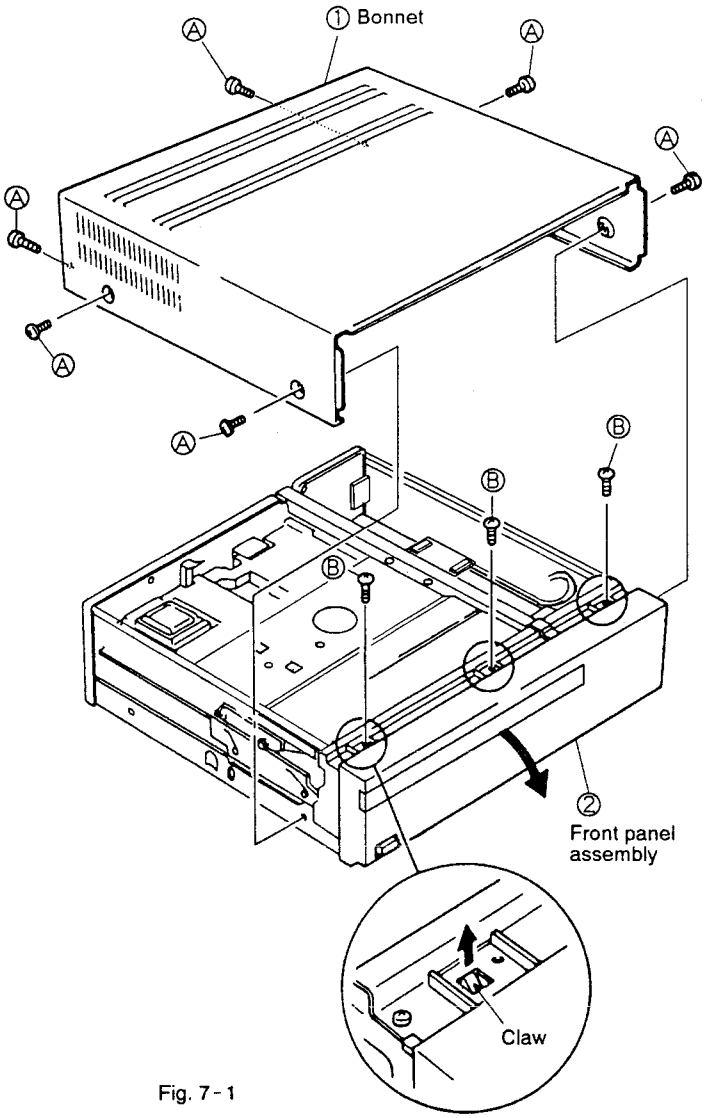


Fig. 7-1

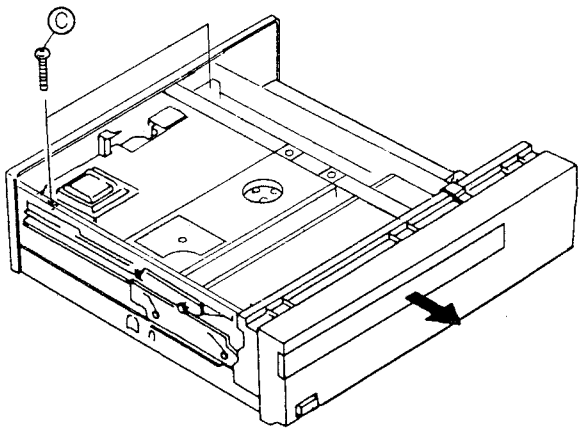


Fig. 7-2

7.2 REMOVING THE TRAY(Fig. 7-2, 3)

① Remove two stopper screws Ⓒ shown in Fig. 7-2. When the power can be turned ON, press the OPEN (▲) button then pull the tray out from the player.
② When the power cannot be turned ON, remove the front panel (Fig. 7-1) and turn the gear pulley shown in Fig. 7-3 counterclockwise, and the tray will slide out toward the front.

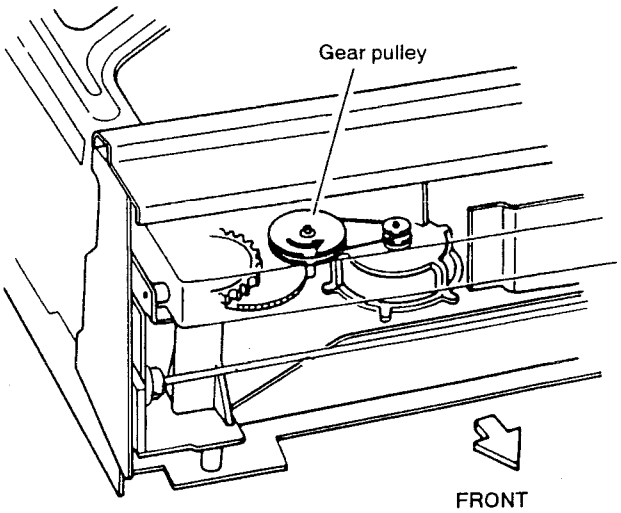
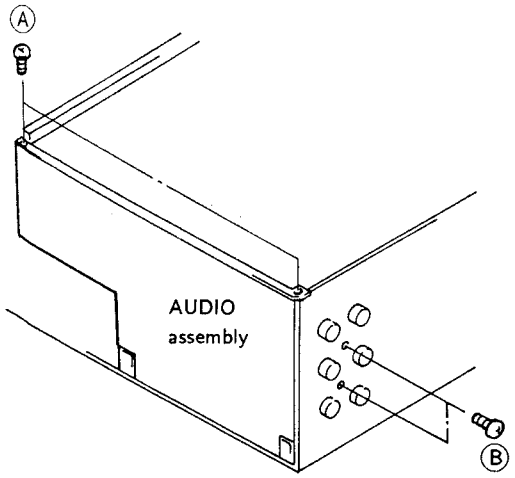


Fig. 7-3

7.3 REMOVING THE AUDIO AND MAIN ASSEMBLY

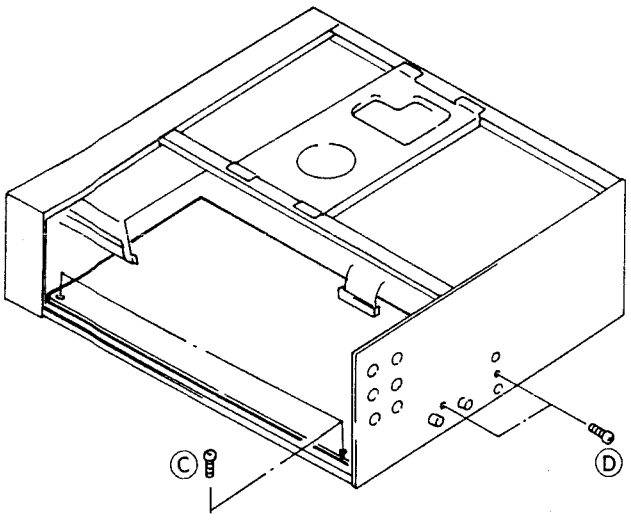
7.3.1 Removing the AUDIO assembly

① Remove two screws Ⓐ and Ⓑ.

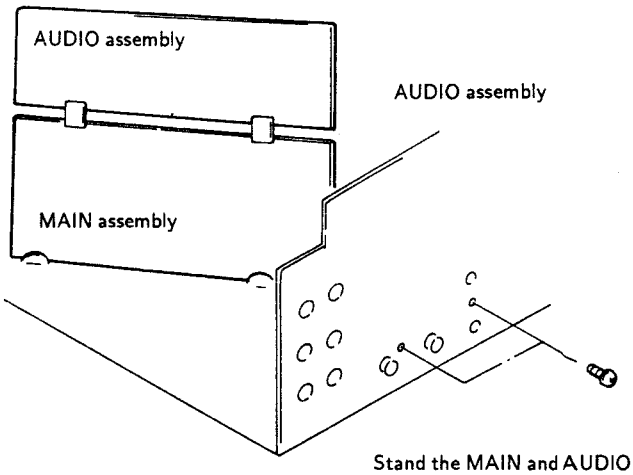


7.3.2 Removing the MAIN BOARD assembly

① Remove two screws Ⓒ.
② Remove two screws Ⓓ from the rear side.

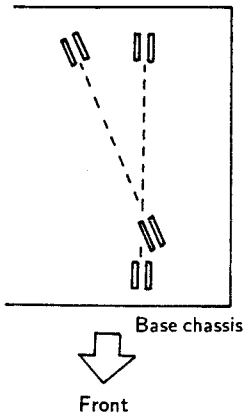


7.3.3 Diagnosis of the AUDIO and MAIN assembly



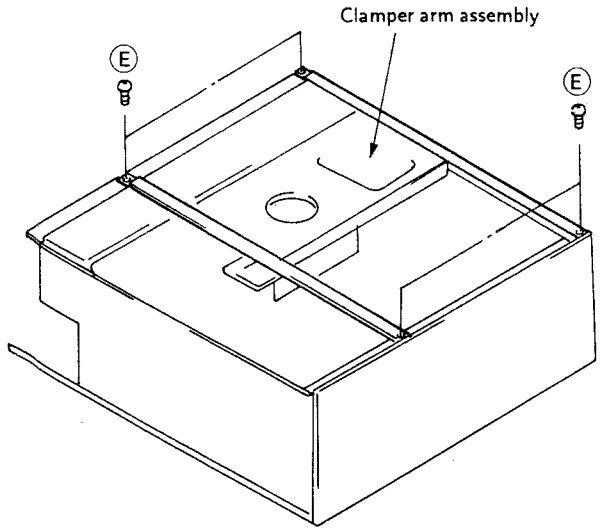
Stand the MAIN and AUDIO assemblies in the chassis as illustrated.

The groove for stand the MAIN assembly when diagnosing the Clamper arm mechanism. When diagnosing the clamper arm mechanism, disconnect the flexible cable.



7.4 REMOVING THE CLAMPER ARM ASSEMBLY (See page 7 - 14)

①Remove four screws Ⓔ.



As to the detail refer to page 7 - 14.

7.5 REMOVING THE PICKUP ASSEMBLY (Fig 7-8)

① Remove the flexible cable from the connector and also remove the flexible cable installed at section ⓐ.
② Remove a screw Ⓐ holding the carriage shaft.
③ Raise the shaft in the direction of the arrow to remove the rack assembly.
④ Remove a hexagonal screw Ⓑ and lift up the pickup assembly alightly and turn the pickup assembly in the direction of arrow ⑤.
⑤ Remove two screws Ⓒ on the back of the pickup assembly.

Note: Make sure that the rack assembly is not close to the turntable when it is removed.

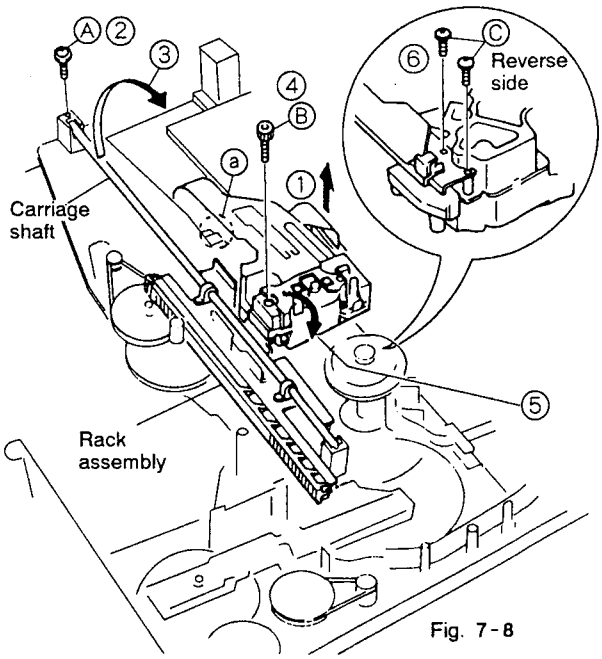


Fig. 7-8

7.6 REMOVING THE TILT SENSOR (Fig.7-9)

① Remove the connector (arrow Ⓐ) of the flexible cable and release the claw (arrow Ⓑ) to remove the tilt sensor.

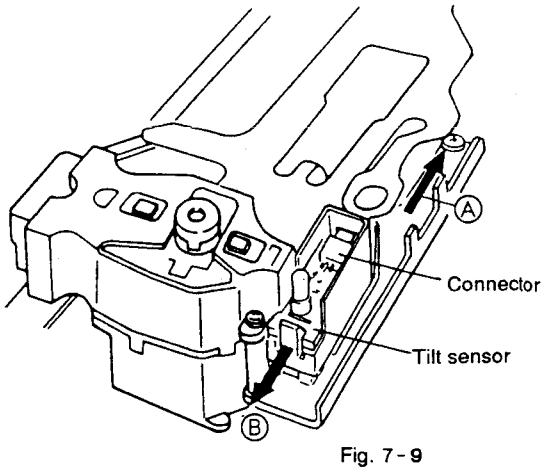


Fig. 7-9

7.7 REMOVING THE MECHANISM SECTION (Fig.7-10)

Remove six screws Ⓐ, and the entire mechanism section can be removed.

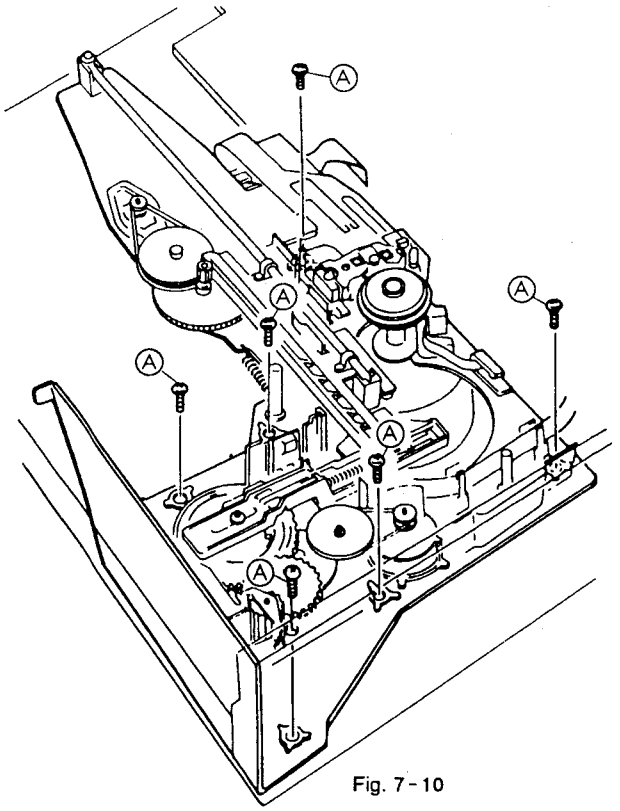


Fig. 7-10

7.8 REMOVING THE SLIDE CAM AND ROLLER PLATE ASSEMBLY(Fig.7-11)

① Set the player with the tray down.
② Remove three screws Ⓐ and slide the slide cam toward the rear to remove it.
③ Remove the clamper arm (A) assembly (see page 77) after removing slide cam to remove the roller plate assembly.

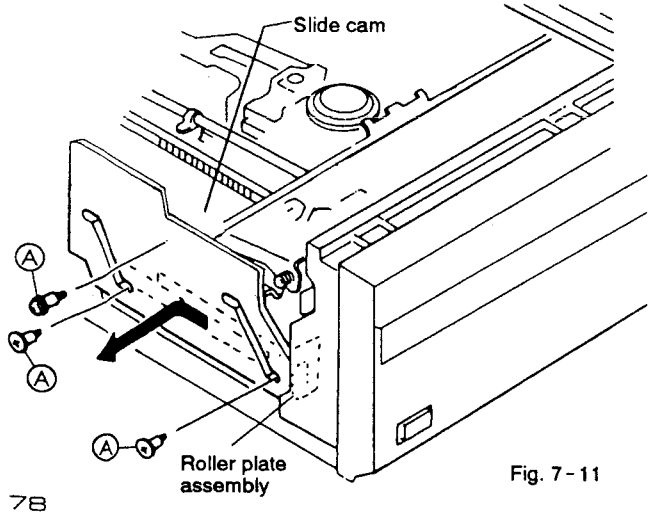


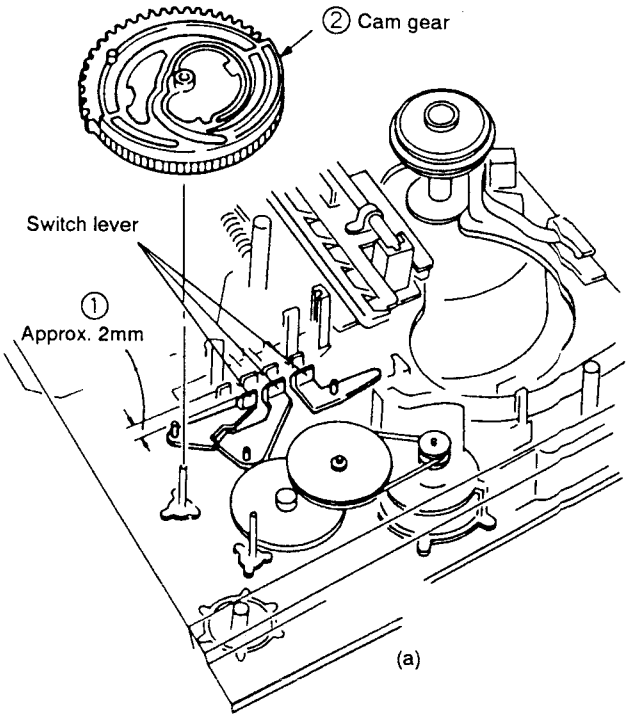
Fig. 7-11

7.9 ASSEMBLING THE MECHANISM SECTION

7.9.1 Positioning the gears

(Since the cam gears are used for the detection of all operation modes in this unit, the cam gears and the tray should be positioned correctly. Reassemble in the following procedure.)

① Position three switch levers so that they are nearly parallel (approx. 2mm), as shown in Fig. 7-12 (a).
② Insert the cam gear so that the end of the spiral groove on the upper surface of the cam gear comes to the position nearest to the shaft located at the front, as shown in Fig. 7-12 (b).
(In this case, the cam gear should be set in the position where the angle between the center line of the cam gear and the pin on the cam gear is 45°, by visual checking.)



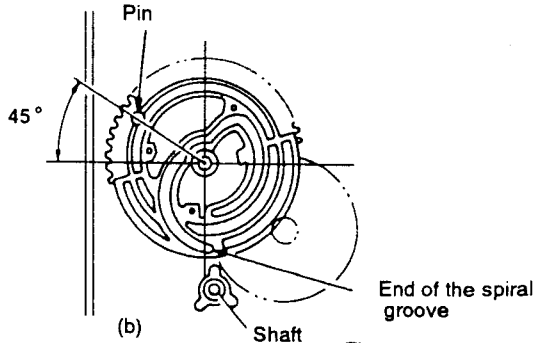


Fig. 7-12

③ Mount the spring slanting cam by raising the rack assembly in the direction of the arrow so that the tilt slide section comes under the rack assembly.Then, mount the cam spring. (Fig. 7 - 13 (a))

④ Insert the follow gear so that the "L" - shaped section of the follow gear comes to the end of the cam gear, as shown in Fig. 7 - 13 (b).

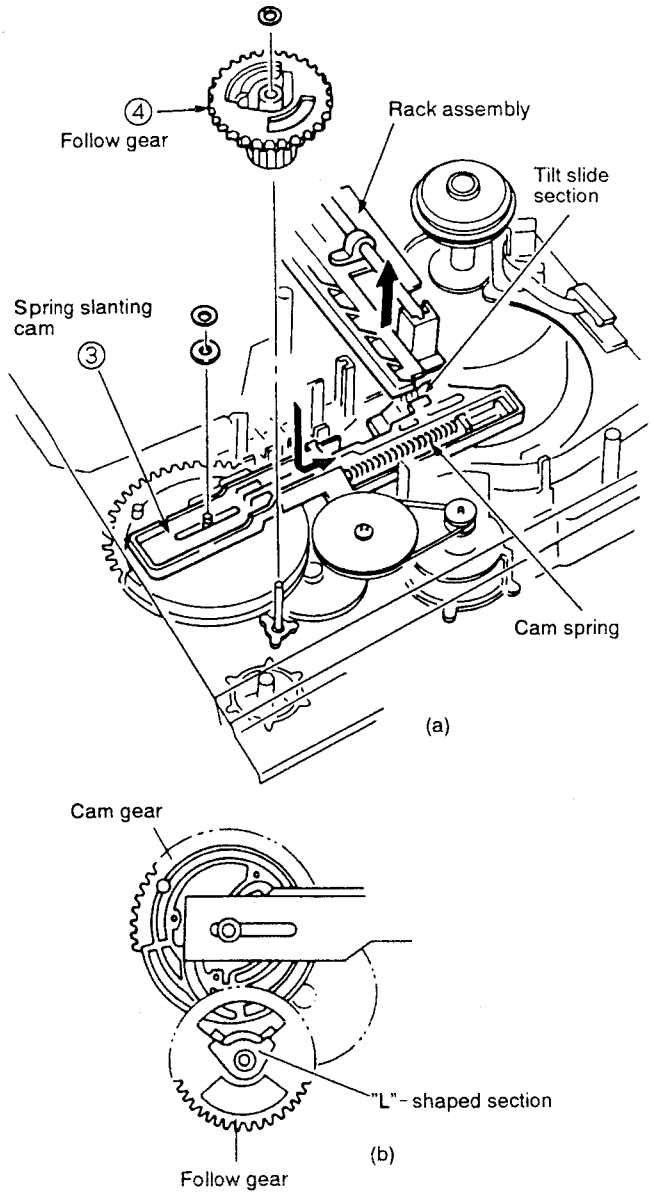


Fig. 7 - 13

⑤ Mount the roller plate assembly in the position where the tooth with the triangle mark (▼) of the follow gear is engaged with the dip of the gear with the short rib on the roller plate gear, as shown in Fig. 7 - 14.

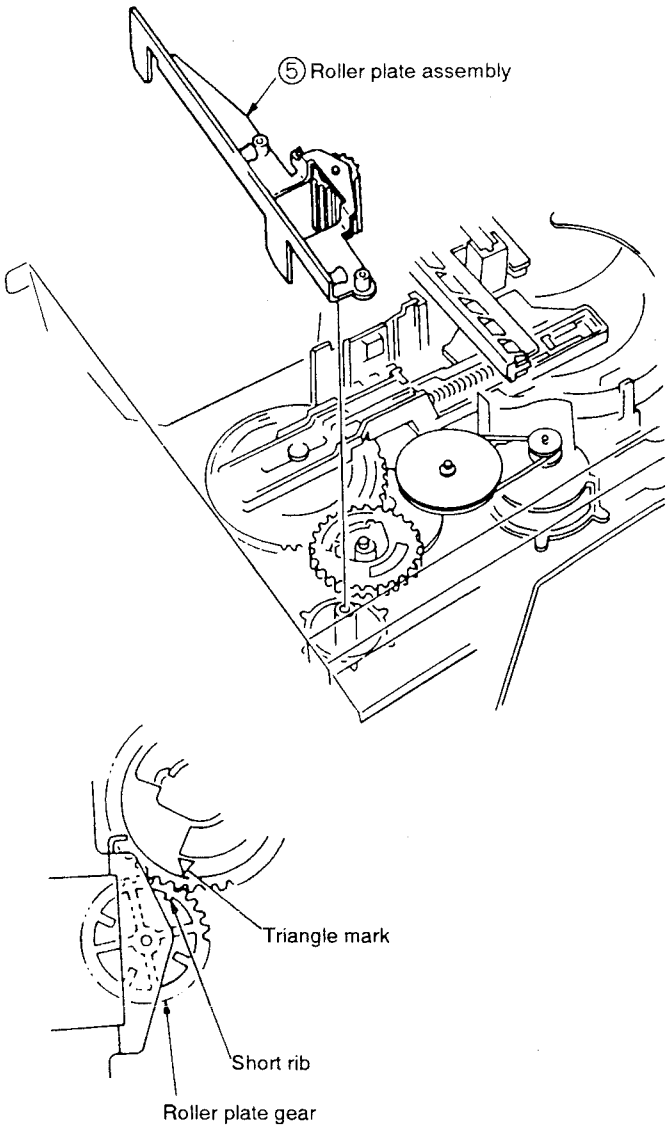


Fig. 7 - 14

7.9.2 Positioning the tray (Fig.7-15)

① Set the player with the tray open.

② Set the roller plate gear so that the roller plate line intersects with the mid - point of missing tooth of the roller plate gear.
(At this time, adjust the position by the method shown in Fig. 7 - 15, or turn the power ON and use the SKIP (|◀◀, ▶▶|) buttons in the direction of OUT tilt it stops as shown in Fig. 7 - 15 - 1.)

③ Insert the tray.
At this time, the tray can be inserted only when the first missing tooth of the tray gear is engaged with the missing tooth section of the roller plate gear, as shown in the figure. (Fig.7 - 15 - 1)
Tray is easier to insert by pushing slightly upwards. (Fig.7 - 15 - 2)

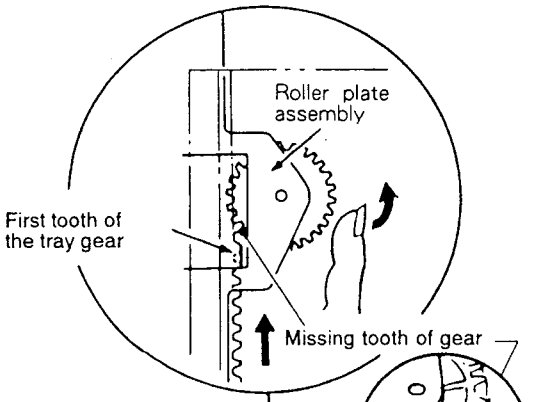


Fig. 7 - 15 - 1

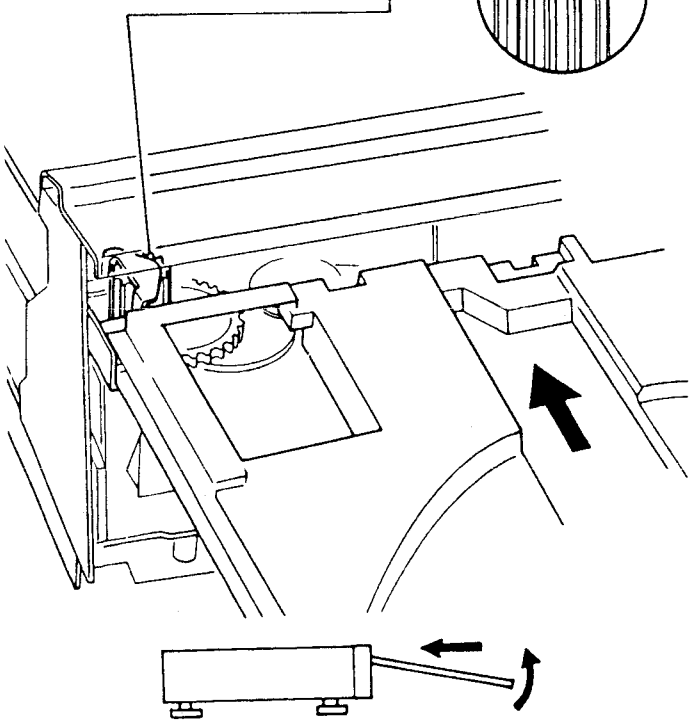


Fig. 7 - 15 - 2

7.9.3 Assembling the servo mechanism base assembly (Fig.7-16)

When assembling the servo mechanism base assembly, pay special attention to the following points:

- After inserting the tilt shaft in the position shown in Fig. 7-16-1 of mechanism chassis assembly, mount the servo mechanism base assembly in the direction of the arrow so that the tilt shaft does not come over the shaft holder as shown in Fig. 7-16-2.
- The thrust spring should not come over the shaft holder.
- Check that the end of the plate spring is inserted under the base.

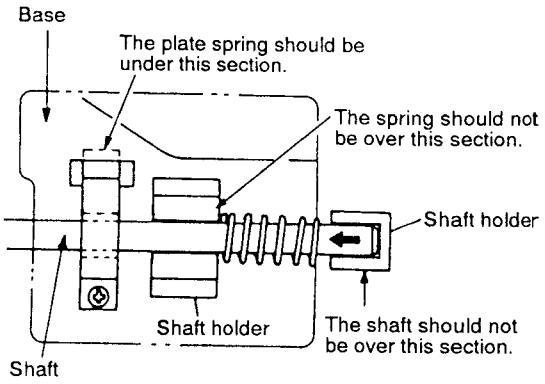

Base
The plate spring should be under this section.
The spring should not be over this section.
Shaft holder
Shaft holder
The shaft should not be over this section.
Shaft

Fig 7 - 16 - 1

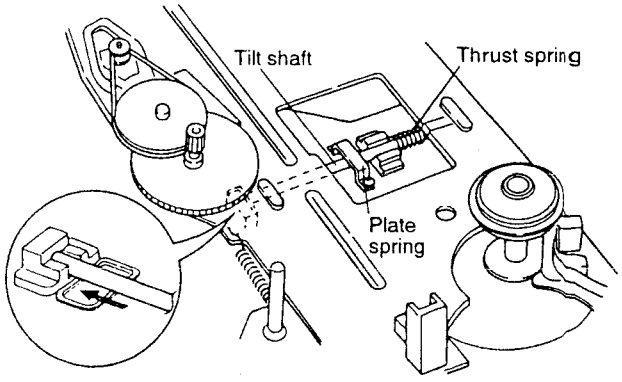


Fig. 7 - 16 - 2

7.9.4 Styling of the flexible cable (Fig.7-17)

① Bend the flexible cable of the pickup assembly by about 45° at the ▲ mark.
② Insert the flexible cable into the connector.
③ Set the flexible cable under the protruding section.
④ Twist the flexible cable by a half turn.
⑤ Insert the triangular section.
⑥ Further insert the flexible cable under the protruding section.

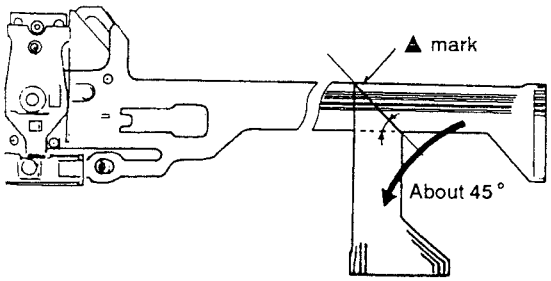


Fig. 7-17-1

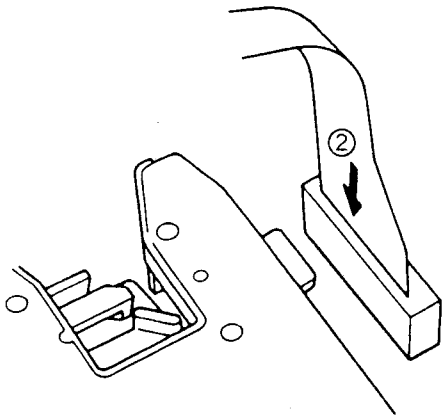


Fig. 7-17-2

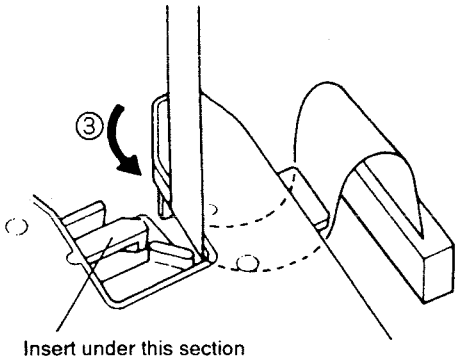


Fig. 7-17-3

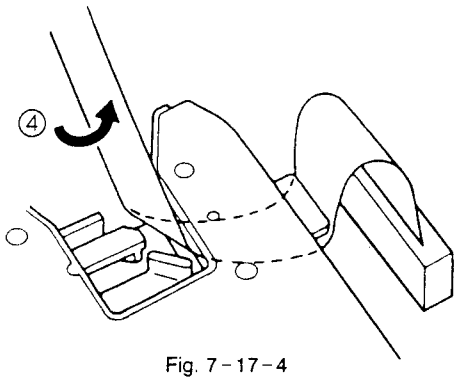


Fig. 7-17-4

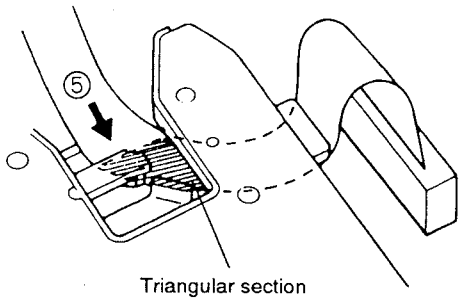


Fig. 7-17-5

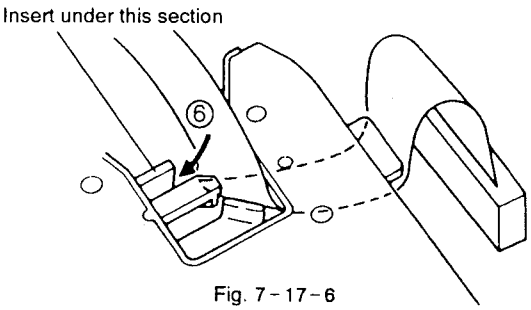


Fig. 7-17-6

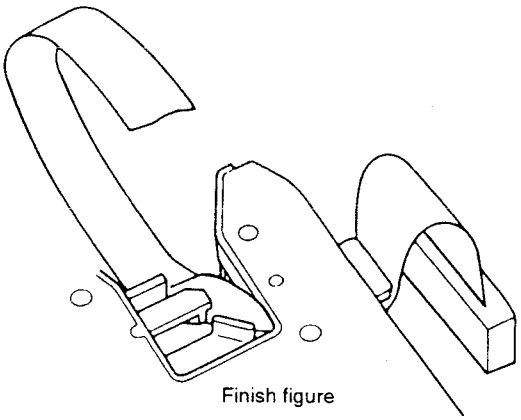


Fig. 7-17-7

7.10 DIAGNOSING THE SYPS ASSEMBLY (Fig.7-18)

Procedure - 1

1. Remove the screw fixing the SYPS assembly and keep the SYPS assembly apart about 3cm from the base chassis (See Fig. 7 - 18 - 1).

2. Insert a soldering iron between the SYPS assembly and base chassis, alternately desolder the lapping pins of an AC power cord, and remove the lapping pins (See Fig. 7 - 18 - 1).

3. Solder the lapping pins through the foil side of the board with the SYPS assembly raised.
   The SYPS assembly can be diagnosed for component replacement through the foil side.
   (See Fig. 7 - 18 - 2).

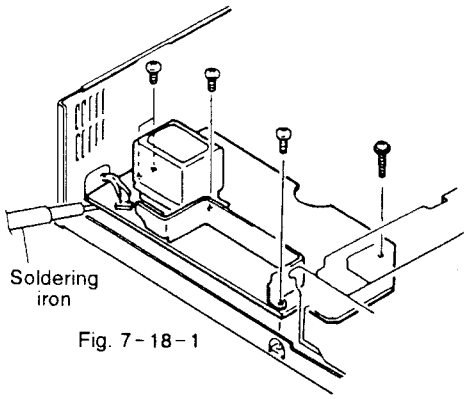


Fig. 7 - 18 - 1

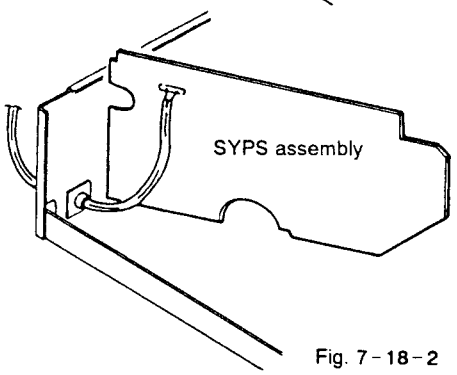


Fig. 7 - 18 - 2

Notes:
1. Interpose cloth for check so that the SYPS assembly does not touch the chassis.
2. Remove the rear panel when you are difficult to work.

Procedure - 2

1. Insert a screwdriver into the chassis hole near a strain relief through the back of the base chassis and remove the strain relief stop ring.

2. Remove the strain relief and pull the AC power cord toward the main unit to set up the SYPS assembly.

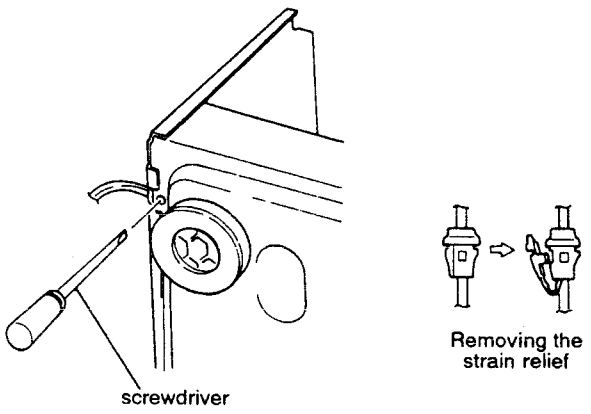


Fig. 7 - 19

8. ADJUSTMENT

8.1 MAIN ASSEMBLY ADJUSTMENT SUMMARY

	ADJUSTMENT	P	Adjusting Point	Measurement equipment Connecting Point	Player Condition	Adjusting Specification
1	Tilt Servo Gain Adjustment	90	VR608	None	Power off	• Making of Tilt GAIN VR position Red :Turn to Right Clear : Center Blue :Turn to Left
2	Coarse Adjustment of Grating and TRK Balance Adjustment	91	Grating/VR602	CN401 - 8 (TRK ERR)	• Test mode #15,000 TRK servo loop open	• Null point → TRK error MAX • Adjust VR602 so that the TRK error waveform amplitude's positive and negative level become equal.
3	Slider Shaft Horizontal Adjustment	92	Player SKIP key	CN401 - 2 (FCS RTN)	• Test mode Tilt servo loop off TRK servo loop open #5.200	• Use the SKIP key to adjust to 0V ± 20mV.
4	Pickup Inclination Adjustment	93	Pickup Assembly TAN / TRK inclination adjustment screw	CN401 - 1 (RF)	• Test mode #2,701 still TRK servo loop close /open Tilt servo loop open	• RF waveform's amplitude MAX (Pickup TAN / TRK adjustment screw) • Minimized crosstalk.
5	TRKG Error Best / Crosstalk Best Adjustment	94	VR605 (TE BEST) VR606 (CT BEST)	CN401 - 8 (TRK ERR) CN401 - 1(RF)	• Test mode TRK servo close / open Tilt servo loop off	• RF MAX (VR606) TRK error MAX (VR605)
6	FOCS SUM Level Adjustment	95	VR609	CN401 - 10 (FCS SUM)	• Play mode	• Adjust VR 609 so that the voltage becomes 1.5VDC.
7	Tilt Sensor Inclination / Tilt Balance Adjustment	96	Tilt sensor inclination adjustment screw VR607(TILT BAL)	TV monitor Test mode screen	• Test mode #16,200 / #115 still TRK servo loop close Tilt servo loop off	• Set VR 607 to the center. • Adjust the adjustment screw so that the tilt error display code is 6,7, or 8. • Adjust VR607 so that the tilt error display becomes 7.
8	Verification and Adjustment of Spindle Motor Centering	97	Spindle motor centering adjustment screw.	CH1:CN401 8 (TRK ERR) CH2:CN401 7 (TRK SUM) (X - Y mode)	• Test mode #25,000 / #3,000 TRK servo loop open Tilt servo loop on	• Adjust the centering adjustment screw so that the lissajous figures of #3,000 and #25,000 are the same.
9	Fine Adjustment of Grating and TRK Balance Adjustment	98	Grating / VR602	CH1:CN401 - 8 (TRK ERR) CH2:CN401 - 7 (TRK SUM) (X - Y mode)	• Test mode TRK servo loop open Tilt servo loop on	• Minimize the Y direction of the lissajous figure. • Level of the X direction of the lissajous figures are equal.
10	FCS Servo Loop Gain Adjustment	99	VR604	CH1:CN401 - 5 (FCS IN) CH2:CN401 - 4 (FCS ERR) (X - Y mode)	• Test mode #15,000 still TRK servo loop close Tilt servo loop on	• Adjust VR604 so that the lissajous figure is symmetric with respect to the X and Y axes.
11	TRK Servo Loop Gain Adjustment	100	VR603	CH1:CN401 9 (TRK IN) CH2:CN401 - 8 (TRK ERR) (X - Y mode)	• Test mode #15,000 still TRK servo loop close Tilt servo loop on	• Adjust VR603 so that the lissajous figure is symmetric with respect to the X and Y axes.
12	RF Gain Adjustment	101	VR601	CN401 - 1(RF)	• #15,000 still	• Adjust VR601 so that the RF level becomes 300mV ± 50mV.
13	Ref. Sub Carrier Adjustment	102	VC901	IC402 pin 8	• STOP	• Adjust VC901 so that the frequency becomes 3.579545 MHz.
14	VCO Center Frequency Adjustment	103	VR481	CH1:C471 + lead wire CH2:C499 + lead wire	• #5,100 still	• The center of CH1's video signal jitter is delayed by 71 μS with CH2's video signal.
15	Output Video Level Adjustment	104	VR482	VIDEO OUT terminal	• #19,900 still	• Adjust the VR482 so that the voltage between the sync tip and the white peak becomes 0.71V ± 5%.
16	1H Delay Video Level Adjustment	105	VR441	CH1:C443 – lead wire CH2:C445 – lead wire	• #3,800 still	• The 1H delay video level becomes the same as the main line video level.
17	VPS Error Adjustment	106	VR521	TV monitor	• #8,000 still	• Color irregularity on the magenta screen is minimized.

8.2 ADJUSTMENT POINTS OF THE MAIN ASSEMBLY

VR 441 : 1 H DLY VIDEO

VR 481 : VCO CENTER FREQ.
VR 482 : VIDEO LEVEL

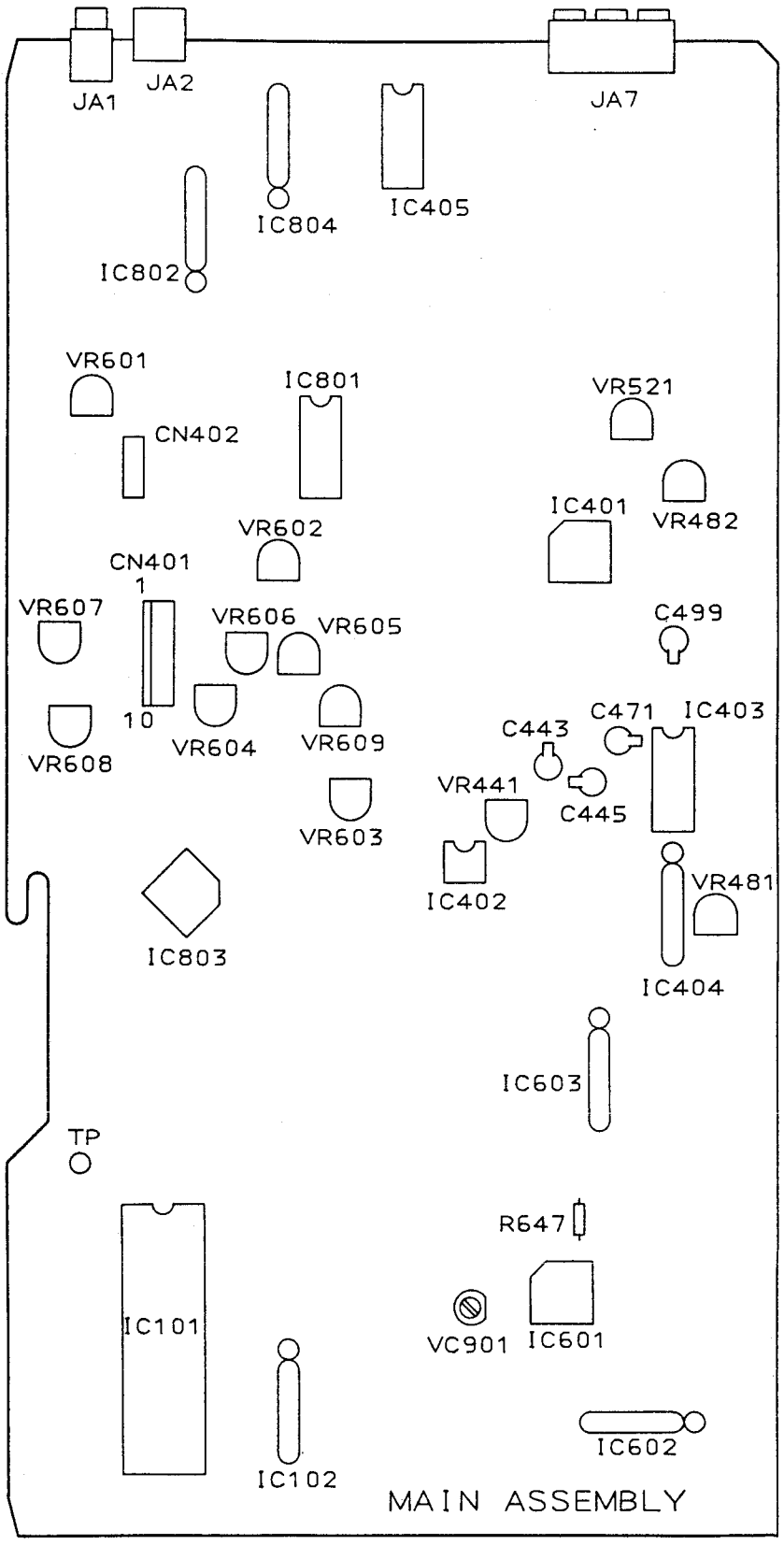
VR 521 : VPS ERR LEVEL

VR 601 : RF LEVEL
VR 602 : TRKG BAL.
VR 603 : TRKG GAIN
VR 604 : FOCS GAIN
VR 605 : TE MAX
VR 606 : CT BEST
VR 607 : TILT BAL
VR 608 : TILT GAIN
VR 609 : FOCS SUM

VC 901 : 14.31818 MHz

CN 401

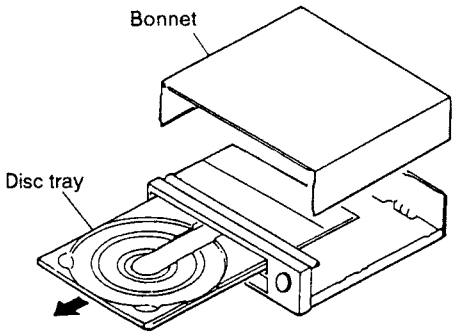
PIN 1 : RF
PIN 2 : FOCS RTN
PIN 3 : TRKG RTN
PIN 4 : FOCS ERR
PIN 5 : FOCS IN
PIN 6 : GND
PIN 7 : TRKG SUM
PIN 8 : TRKG ERR
PIN 9 : TRKG IN
PIN 10 : FOCS SUM



8.3 TEST MODE

8.3.1 TEST MODE

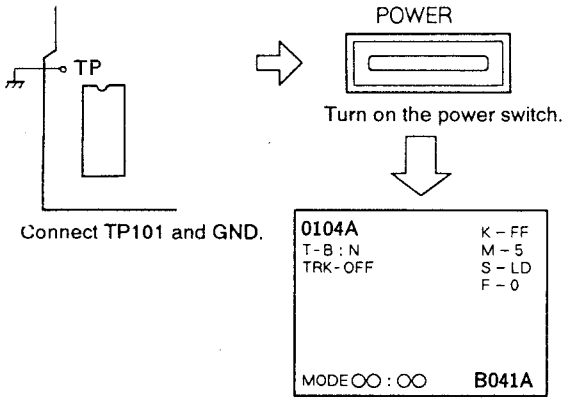
The player has a test mode function which allows the servicer to check the player's status on the TV screen by executing the respective key operation.
Also, since the TRK servo opens and closes easily, the test mode is especially useful for mechanical adjustments.



8.3.2 TEST MODE INITIATION

[Procedure]

1. Remove the bonnet and disc tray.
2. Connect the TP101 (TEST) in the MAIN assembly to GND.
3. Turn on the power switch.
4. Disconnect the TP101 from GND.



TV screen display

8.3.3 TEST MODE CANCELLATION

Turn off the power switch.

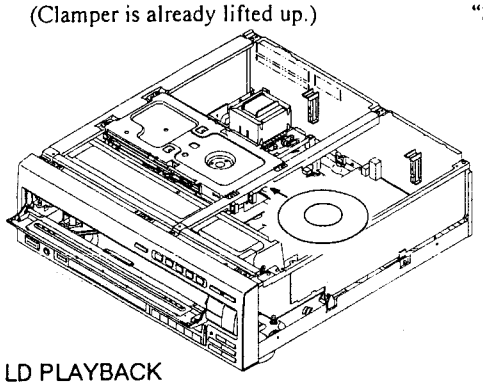
Note : Before cancelling the test mode, be sure to rotation of disc is stopped.

8.3.4 PLAYER OPERATION IN THE TEST MODE

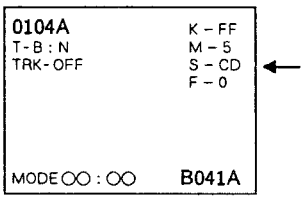
Operate the player by selecting a test mode function with the keys on the player or on the remote control unit.

- CD PLAYBACK

① Place the CD disc on the turn table. (Clamper is already lifted up.)



② Press the [◀◀] or [▶▶] key to appear "S-CD" on the TV screen display.

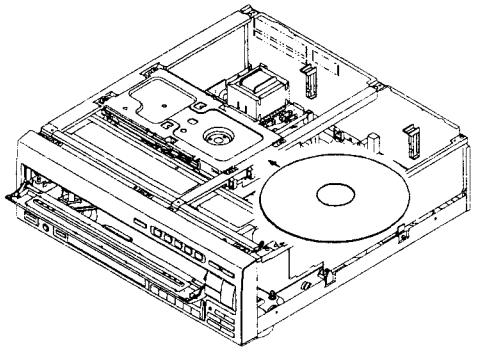


TV screen display

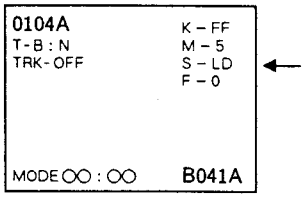
③ Clamp the disc by pressing the PLAY (▶) key once. Then, press the PLAY (▶) key twice, disc will be normal playbacked.

- LD PLAYBACK

① Place the LD disc on the turn table. (Clamper is already lifted up.)



② Press the [◀◀] or [▶▶] key to appear "S-LD" on the TV screen display.



TV screen display

③ Clamp the disc by pressing the PLAY (▶) key once. Then, press the PLAY (▶) key twice, disc will be normal playbacked.

Function	Player Status	Key Operation	Remarks
Open Tray	STOP mode	▲	
Close Tray	Tray open	▲	
Stop	PLAY mode	■	
Play	Disc placement and tray closed.	▶	• Start play with the TRK servo open. • Start play with tilt neutral. • The disc type (LD/CD/CDV) is determined when playback starts at the SLDR position during start play.
TRK Servo Open/Close	PLAY mode	▶	• Each time the PLAY button (▶) is pressed, the TRK servo will open or close alternately.
Still	PLAY mode TRK servo closed.	❚❚ (Remote control unit key)	• Each time the STILL button (❚❚) is pressed, the player will switch between the PLAY and STILL modes alternately.
SLDR REV SCAN	PLAY mode	◀◀	• Counterclockwise • With the TRK servo open, the pickup can be damaged if the SLD moves further inward than the lead-in area on the disc. Do not allow the SLD to move further inward than the lead-in area .
SLDR FWD SCAN	PLAY mode	▶▶	• Clockwise • With the TRK servo open, the pickup can be damaged if the SLD moves further outward than the lead-in area on the disc. Do not allow the SLD to move further outward than the lead-in area.
TILT Neutral	POWER switch ON	(Main unit key)	
TILT Servo ON	PLAY mode	RANDOM PLAY	
TILT Minus TILT Servo OFF	PLAY mode	I◀◀	• Press and hold down the keys.
TILT Plus TILT Servo OFF	PLAY mode	▶▶I	• Press and hold down the keys.
Screen Display ON/OFF	POWER switch ON	PGM key	
Frame search	PLAY mode	+10 key ↓ 0-9 key ↓ ▶	• In the PLAY mode, press the +10 key. (The player will standby for the frame No. entry.) • Use the numeric keys(0 – 9) to enter the frame No.. Then press the player's PLAY key to search. • After the search is completed, the player will return to the previous mode before the search was performed.
Loading Motor Rotation Clockwise Counterclockwise	Tray open	▶▶I I◀◀	• FWD:Unloading • REV :Loading
FOCS OFFSET (CT BEST) VR606 Check	PLAY mode (TRK servo OPEN)	(Remote control unit) MULTI-SPEED FWD →F-1 REV →F-0 (Player) HILITE INTRO SCAN	• For checking VR604 F-0 : Normal mode •When closing the TRK servo, VR606 (CT BEST) is effectived. •When opening the TRK servo, VR605 (TE MAX) is effectived. F-1 : When opening the TRK servo, VR606 (CT BEST) is also effectived.

• Special Test Mode Operation of CLD-M 90

① Aging mode

[Procedure]
Press the HILITE/INTRO key with the tray opened.

[Operation]
1. The tray is closed and Disc 1 is inserted. (Refer to page 109.)
2. Clamp Disc 1.
3. Disc 1 is returned to the original position on the tray
4. Operations 2 - 3 are also performed for Discs 2 - 5. (This chain of operation is performed in one cycle.)
5. Ten cycles are performed all together.

Note :
- If the STOP key is pressed during operation, the Disc is returned and stopped.
- If the Disc is not clamped, the stand-by function will be activated and the place of the FL display will become 1.

— FL display(example) —

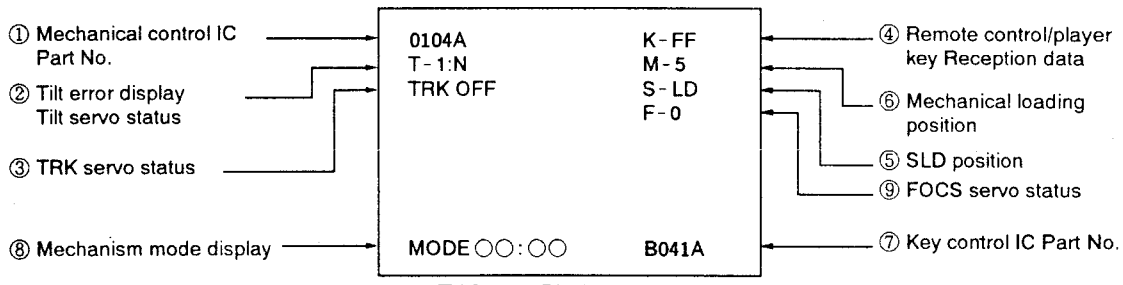
09 00010 ----9 cycles OK. Disc 4 is not clamped during the 10 th cycle.

10 00000 ----Aging is normally completed.

② Disc replacement

[Procedure and operation]
1. Set SLDR to CD position.
2. When pressing the Disc No. key, SPDL begins to rotate after the selected Disc has been moved to the center.
3. The Disc is returned to the disc tray when the STOP key is pressed.

8.3.5 TV SCREEN AND LED DISPLAYS IN THE TEST MODE



TV Screen Display

① The Mechanical Control IC (MAIN assembly) Part No. will be Displayed.

0104 A

② Tilt Servo Status / Tilt Error Display

T-○:○○
- Tilt servo status : N...Tilt neutral
  ON...Tilt servo ON
  OFF...Tilt servo OFF
- Tilt error display: 0 Tilt −
  ↕ Tilt neutral
  F Tilt +

③ TRK Servo Status

TV screen display

TRK-○○○

└—ON...TRK servo close

OFF...TRK servo open

④ Remote Control / Player Key Reception Data

TV screen display

K-○○

└—See table below

Code	Function	Code	Function	Code	Function	Code	Function
00	0	20		40	(CHAP / TRK)	60	
01	1	21		41	(FRAM / TIM)	61	
02	2	22		42	(SEARCH)	62	
03	3	23		43	DISPLAY	63	
04	4	24		44	REPEAT B	64	
05	5	25		45	CLEAR	65	
06	6	26		46	SPEED –	66	
07	7	27		47	SPEED +	67	
08	8	28		48	REPEAT A	68	
09	9	29		49	(2 / R)	69	
0A		2A		4A	(STEREO)	6A	
0B		2B		4B	(1 / L)	6B	
0C	DGT / ANL	2C		4C	PROGRAM	6C	
0D		2D		4D		6D	PLAY /PAUSE
0E	CX	2E		4E		6E	STOP
0F		2F		4F		6F	OPEN / CLOSE
10	(F-SCAN)	30	(DISC TGL)	50	R-STEP	70	
11	(R-SCAN)	31	DISC 1	51		71	DIRECT CD
12		32	DISC 2	52	F-SKIP	72	
13	CHAP / FRME	33	DISC 3	53	R-SKIP	73	
14		34	DISC 4	54	R-STEP	74	ADLC
15		35	DISC 5	55	R-MULT	75	
16	STOP / OPEN	36		56		76	
17	PLAY/SERCH	37		57		77	
18	PAUSE	38		58	F-MULT	78	
19		39		59		79	
1A	(POW ON)	3A		5A	HILIT / INTR	7A	
1B	(POW OFF)	3B		5B		7B	
1C	POW ON/OFF	3C		5C		7C	
1D	EDIT	3D		5D		7D	
1E	AUDIO	3E		5E	RNDM (TEST)	7E	
1F	+10	3F		5F	(ESC)	7F	

⑤ SLD Position

TV screen display

S-○○○

└— IN ... CD inside SW ON

CD ... CD active area

CDV ... CDV active area

LD ... LD active area

⑥ Mechanical Loading Position

TV screen display

M-○

└— 0 ... Tray open

1 ... Loading

2 ... Standby

3 ... Clamped

5 ... Tilt minus

6 ... Tilt neutral (one side)

7 ... Tilt plus

8 ... Tilt limit

9 ... B side clamped (two sides)

⑦ Focus Offset VR Status

TV screen display

F-○

└— 0 ... Normal mode

•When closing the TRK servo, VR606 (CT BEST) is effectived.

•When opening the TRK servo, VR605 (TE MAX) is effectived.

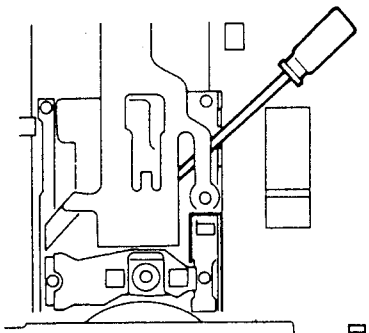
1 ... When opening the TRK servo, VR606 (CT BEST) is also effectived.

2. COARSE ADJUSTMENT OF GRATING AND TRK BALANCE

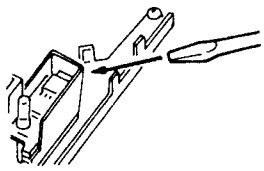
- Purpose: Adjustment of the grating angle to enable disc playback and trick playback.
- When not properly adjusted: The disc cannot be played back. Track skipping occurs.

• Measuring instruments and jigs:	● TV monitor ● Small screwdriver ● Oscilloscope
• Measuring point:	● CN401 - 8 (TRK ERR) and GND
• Test disc and player mode	● 8 - inch LD test disc (GGV1003) ● Test Mode (Disc playback, TRK servo open, Tilt servo OFF)
• Positions to be adjusted	● Pickup assembly grating ● VR602 (TRK BAL).

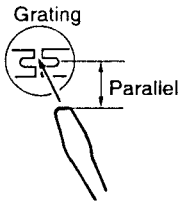
Connection diagram

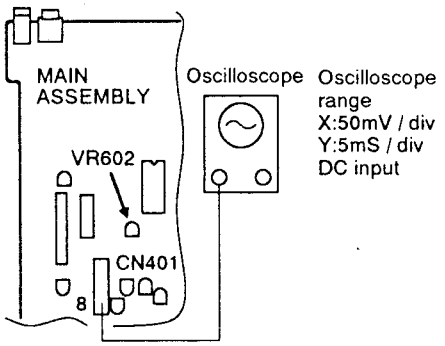


(Top view)
Screwdriver inserting direction



Insert the screwdriver to the slot horizontally for the base.





Oscilloscope range
X:50mV / div
Y:5mS / div
DC input

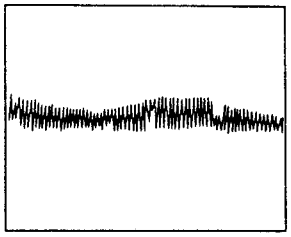


Fig.1 Null Point

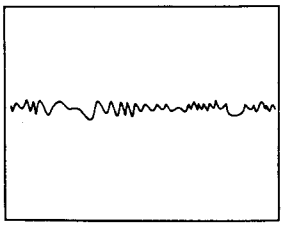


Fig.2 This is not the null point.

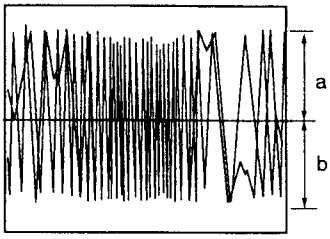


Fig.3 Maximum TRK error.

The positive and negative levels are equal.

Adjustment Procedure

Coarse grating adjustment

1. Insert the test disc and press the PLAY key.
2. Search for frame #15,000 or thereabouts.
3. Open the TRK servo.
4. Connect CN401 - 8 to the oscilloscope and observe the waveform.
5. Slide the tip of a small screwdriver through the guide and insert it horizontally into the grating adjustment slit. Adjust grating angle so that the waveform becomes small a its envelope is smooth. (This point is called null point.) (See Fig. 1 and Fig. 2.)
6. Turn the screwdriver counterclockwise untill the TRK waveform's amplitude reaches the first maximum from the null point.(See Fig. 3.)

TRK balance adjustment

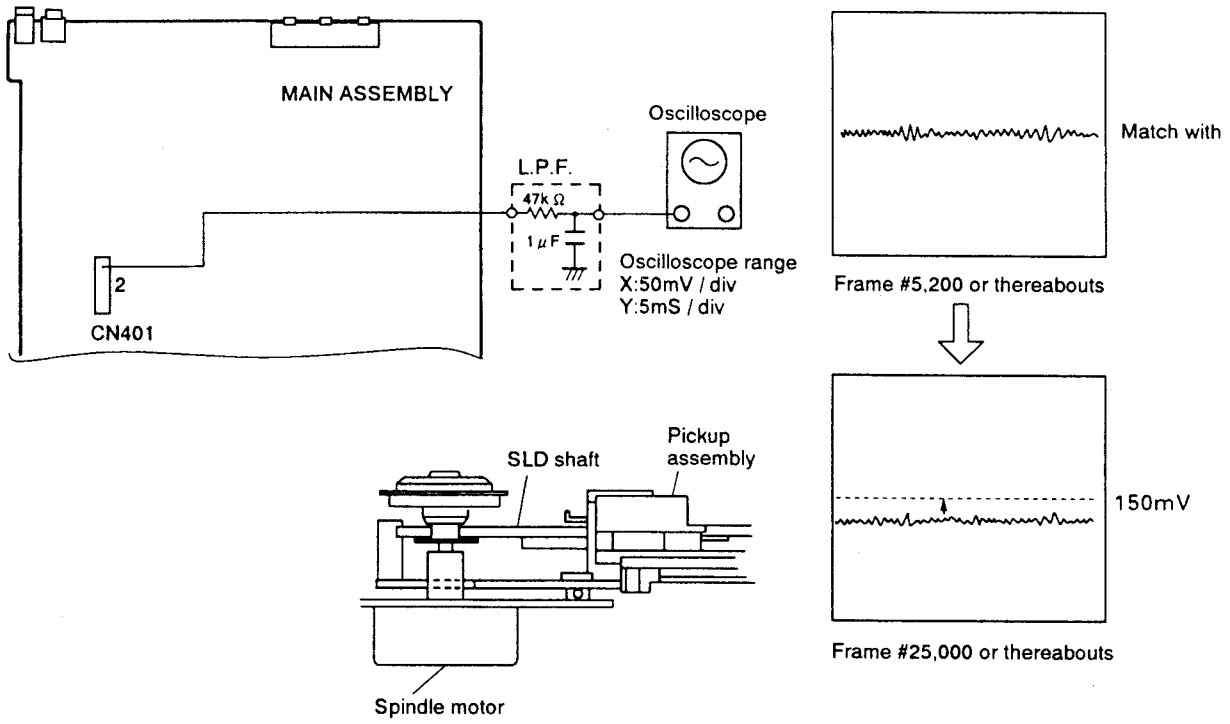
1. Adjust VR602 so that the TRK error waveform amplitude's positive and negative level become equal. (See Fig.3.)
2. Close the TRK servo and check if the image on the TV screen is normal.

3. SLIDER SHFT HORIZONTAL ADJUSTMENT

- Purpose: Setting the slider shaft horizontally to enable the pickup to move over the disc horizontally.
- When not properly adjusted: With a warped disc, the FCS servo does not function at the inner or outer periphery.

• Measuring instruments and jigs:	• Oscilloscope • Low-pass filter (47k Ω + 1 μF)
• Measuring point:	• CN401 - 2 (FCS RTN) and GND
• Test disc and player mode	• 8 - inch LD test disc GGV1003 • Test mode (#5,200 still, TRK servo open, Tilt servo OFF)
• Positions to be adjusted	• Player SKIP key (In the test mode)

Connection diagram



Adjustment Procedure

1. Use the SCAN key to send the slider to frame #5,200 or thereabouts (tilt fulcrum) on the test disc. Open the TRK servo.
2. Connect the oscilloscope to CN401 - 2 through L.P.F. and match the center of the waveform with the oscilloscope's GND.
3. Search for frame #25,000 and use the SKIP key to adjust the center of the waveform to 150mV ± 20mV.

Note : Regarding the test mode, see page 85.

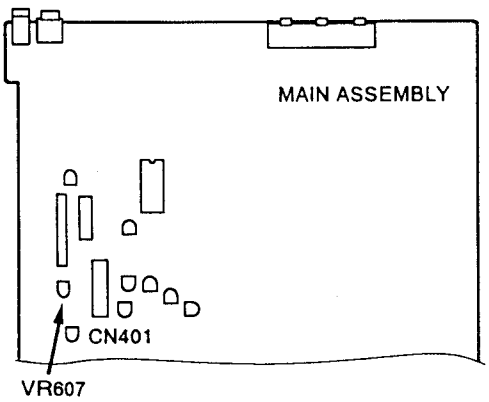
Note : This adjustment is critical in that it will affect the adjustments following.

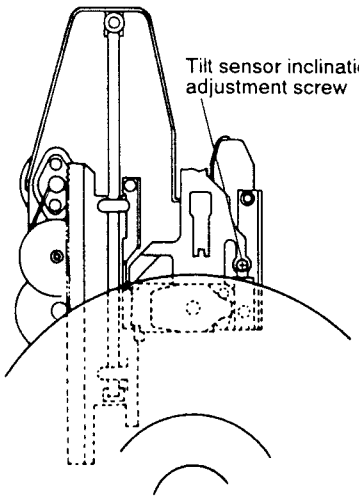
7. TILT SENSOR INCLINATION / TILT BALANCE ADJUSTMENT

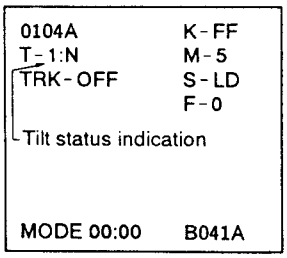
- Purpose: Adjustment of the tilt sensor's inclination to direct the tilt sensor's LED vertically with respect to the disc. Also, compensation for the sensitivity difference between the two sensors.
- When not properly adjusted: Crosstalk will be generated.

• Measuring instruments and jigs:	• TV monitor • Small Phillips screwdriver
• Measuring point:	• Player's VIDEO OUT terminal
• Test disc and player mode	• 8-inch LD test disc (GGV1003) • Test Mode (#16,200 still, TRK servo closed, Tilt servo OFF)
• Positions to be adjusted	• Tilt sensor inclination adjustment screw • VR607 (TILT BAL).

Connection diagram







TV screen display

Note: This display indicates the tilt error display's location. Other displays may differ slightly from the actual.

Adjustment Procedure

1. Search for frame #16,200 on the test disc.
2. Set VR607 to the mechanical center.
3. Adjust the tilt sensor inclination adjustment screw so that the tilt status display code is 6, 7, or 8 on the TV monitor.

Note : Turn the tilt sensor inclination adjustment screw clockwise more than 1/4 turn to complete the adjustment.

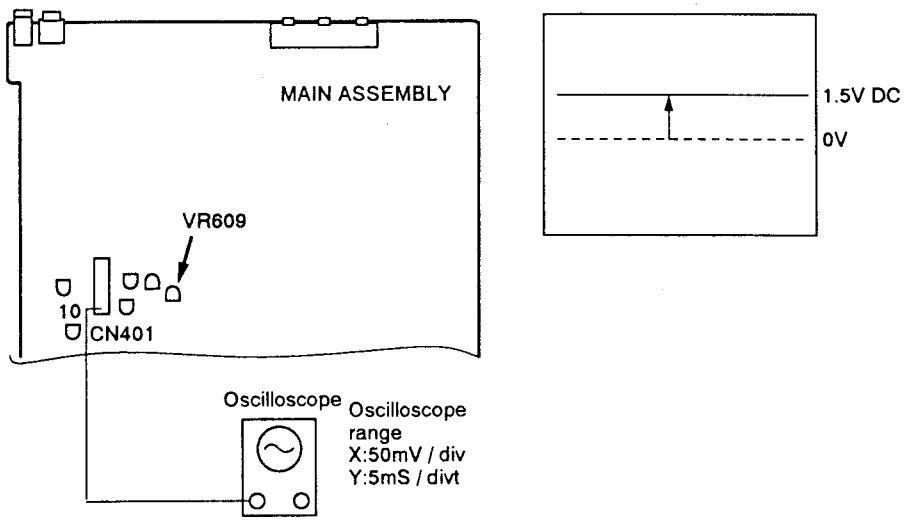
4. Search for frame #115.
5. Adjust VR607 so that the tilt error display becomes 7.

6. FOCS SUM LEVEL ADJUSTMENT

- Purpose: To set the sum level (FOCS A+B) of B1 – B4 to the optimum value for activating the FOCS servo.
- When not properly adjusted: Crosstalk will be generated.

• Measuring instruments and jigs:	● TV monitor ● Oscilloscope
• Measuring point:	● CN401 - 10
• Test disc and player mode	● 8 - inch LD test disc (GGV1003) ● Normal play mode
• Positions to be adjusted	● VR609

Connection diagram



Adjustment Procedure

Note : Perform this adjustment after perform the "5. TRKG Error MAX / Crosstalk Best Adjustment".

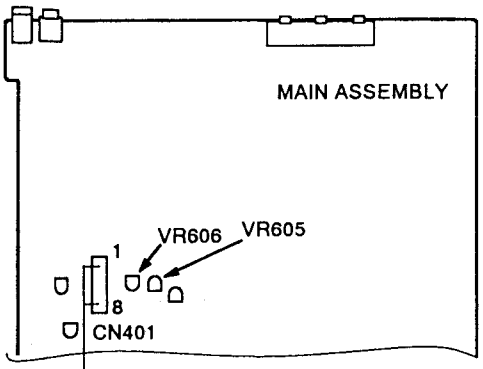
1. Connect the oscilloscope to CN401 - 10.
2. Adjust VR609 so that the voltage becomes 1.5V DC.

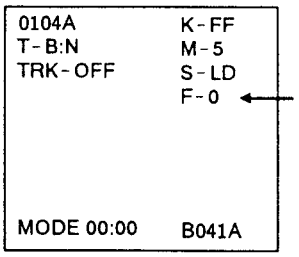
5. TRKG ERROR MAX / CROSSTALK BEST ADJUSTMENT

- Purpose: To set the FOCS servo to the optimum state when playing the normal playback and track jump (search).
- When not properly adjusted: Crosstalk will be generated.

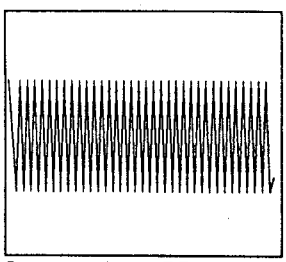
• Measuring instruments and jigs: • Measuring point: • Test disc and player mode	• TV monitor • Oscilloscope • CN401 - 1 (RF) • CN401 - 8 (TRK ERR) • Player's VIDEO OUT terminal • 8 - inch LD test disc (GGV1003) • Test Mode (TRK servo close / open, Tilt servo OFF)
• Positions to be adjusted	• VR605 (TE MAX) • VR606 (CT BEST)

Connection diagram

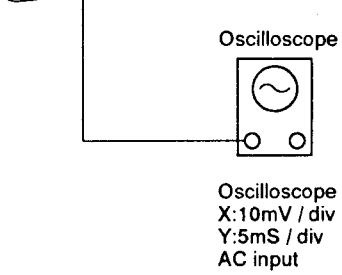




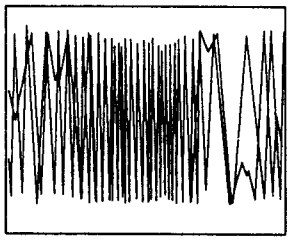
Screen display of test mode



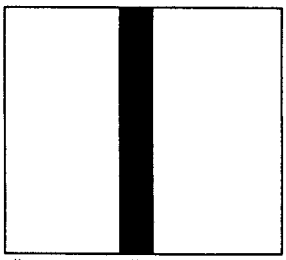
Set to maximum RF amplitude at frame #2,701.



Oscilloscope range
X:10mV / div
Y:5mS / div
AC input



Maximize the TRKG error.



#115 crosstalk minimum

Adjustment Procedure

Note : Perform this adjustment when there is still noticeable crosstalk on the TV screen in section "4. Pickup Inclination Adjustment".

1. Connect the oscilloscope to CN401 - 8.
2. Open the TRK servo .
3. Confirm that the test mode screen display is F - 0.
   If not, set the MULTI - SPEED REV button of the remote control unit to F - 0.
4. Adjust VR605 so that the amplitude of the TRKG error waveform becomes maximum.
5. Close the TRKG servo.
6. Connect the oscilloscope to CN401 - 1 .
7. Press the MULTI - SPEED FWD button of the remote control unit to display "F - 1" on the TV screen.
8. Search frame #2,701 and adjust VR606 so that the amplitude of the RF waveform becomes maximum.
9. Confirm that the crosstalk on the TV screen becomes minimum at frame #115.

Note : After adjustment is complete, be sure to perform "6. FOCS SUM Level Adjustment".

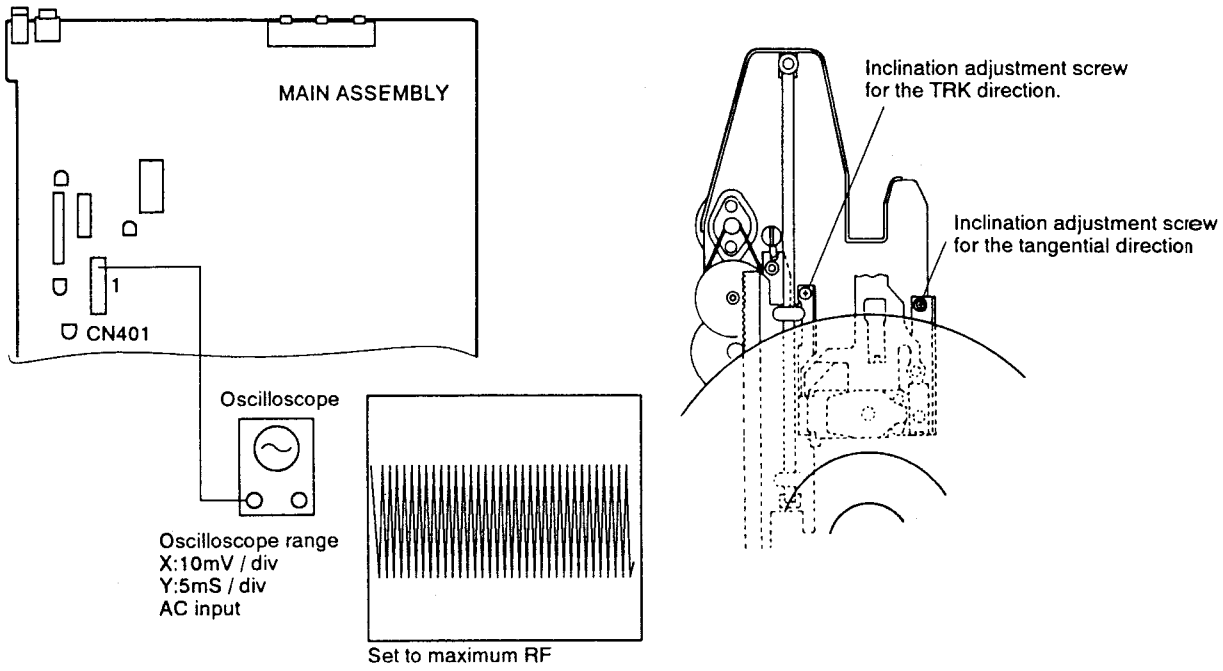
4. PICKUP INCLINATION ADJUSTMENT

Mechanical Adjustment

- Purpose: Adjustment of the pickup inclination to direct the laser beam vertically with respect to the disc.
- When not properly adjusted: Crosstalk will be generated.

• Measuring instruments and jigs:	● TV monitor ● Oscilloscope
• Measuring point:	● CN401 - 1 (RF)
• Test disc and player mode	● 8 - inch LD test disc (GGV1003) ● Test Mode (#2,701 still (Black screen))
• Positions to be adjusted	● Pickup assembly TRK / Tangential direction inclination adjustment screws

Connection diagram



Adjustment Procedure

1. Connect the oscilloscope to CN401 - 1.
2. Search for #2,701 and observe the RF waveform.
3. Adjust the pickup's TRK / Tangential direction inclination adjustment screw to maximize the waveform's amplitude.
4. Look at the TV screen and make sure there is no crosstalk.

Note : If there is crosstalk on the TV screen even when the RF level is at the maximum, perform next steps .

8.4 ADJUSTMENTS

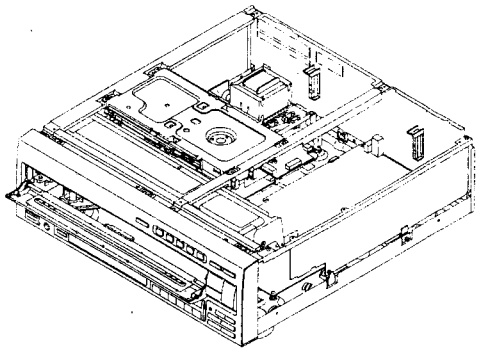
8.4.1 Required Instruments

- Small screwdriver (7 cm shaft)
- Small Phillips screwdriver (15 cm shaft)
- Low - pass filter (47k ohms+1 μF / BP)
- Dual - trace oscilloscope (with delay)
- AF oscillator
- Frequency counter
- LD test disc (GGV1003)
- 8 - inch LDD disc
- CDV disc
- Short clip
- TV monitor
- Resistor (100k ohms, 330k ohms)
- Capacitor (0.01 μF)
- Remote control unit
- 2mm hexagonal wrench

8.4.2 Adjustment Preparation and Notes

1. Player Preparation

Befor perform the adjustment, remove the bonnet and the disc tray. Then place the player horizontally on a flat surface.



2. Disc Insertion

Insert the disc from the rear of the player. Place it securely on the turntable. When the PLAY key is pressed, the clamper will go down and secure the disc. Playback will then begin.

3. Use All the Oscilloscope's Probes at 10:1.

4. Only the MAIN Assembly Needs to be Adjusted.

Unless noted otherwise, all adjustment items and measuring instrument connections will be for the parts in the MAIN assembly.

5. Required adjustment after Replacement of major parts.

Adjustments	Replacements				
	Pickup	Actuator	Pre-pickup	Spindle motor	Tilt sensor
1. Tilt Sensor Adjustment	◎				◎
2. Coarse Grating Adjustment / TRK Balance Adjustment	◎	◎	◎		
3. Slider Shaft Horizontal Adjustment	◎	◎	◎	○	◎
4. Pickup Inclination Adjustment	◎	◎	◎	○	○
5. TRKG Error Best / Crosstalk Best Adjustment	◎	◎	◎	○	○
6. FOCS SUM Level Adjustment	◎	◎	◎	○	○
7. Tilt Sensor Inclination / Tilt Balance Adjustment	◎	◎	◎	○	◎
8. Spindle Motor Shaft Centering and Adjustment	◎	◎	◎	◎	
9. Fine Grating Adjustment / TRK Balance Adjustment	◎	◎	◎		
10. FCS Servo Loop Gain Adjustment	◎	◎	◎		
11. TRKG Servo Loop Gain Adjustment	◎	◎	◎		
12. RF Gain Adjustment	◎	◎	◎		

Note: Adjustments indicated by a ○ are made only when there is crosstalk.

8.4.3 MECHANICAL ADJUSTMENTS

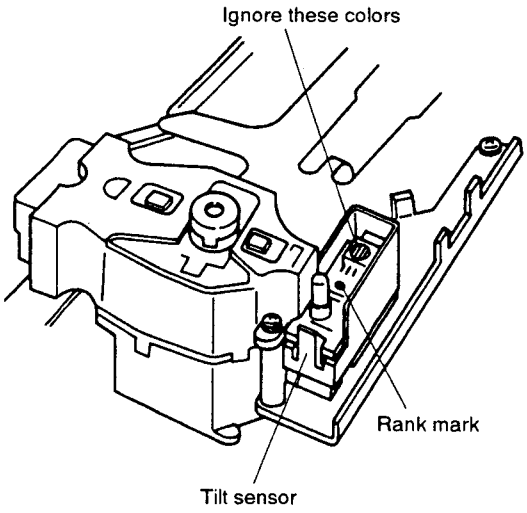
1. TILT SERVO GAIN ADJUSTMENT

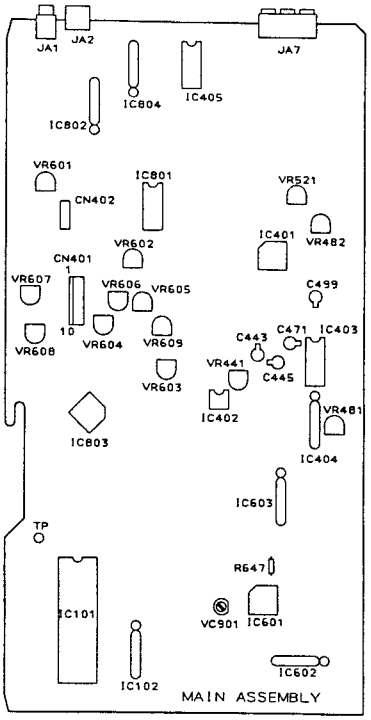
Mechanical Adjustment

- Purpose: Adjustment of the tilt servo's gain according to the tilt sensor's sensitivity rank.
- When not properly adjusted: Increased tilt servo hunting and increased crosstalk.

• Measuring instruments and jigs: • Measuring point: • Test disc and player mode	• Small screwdriver
• Positions to be adjusted	• VR608

Connection diagram





Adjustment Procedure

1. Use a screwdriver to adjust the angle of VR608 on the MAIN assembly according to the rank indicator's color.

Rank	Color	VR Angle
A	Red	Clockwise all the way
B	Clear	Mechanical center
C	Blue	Counterclockwise all the way

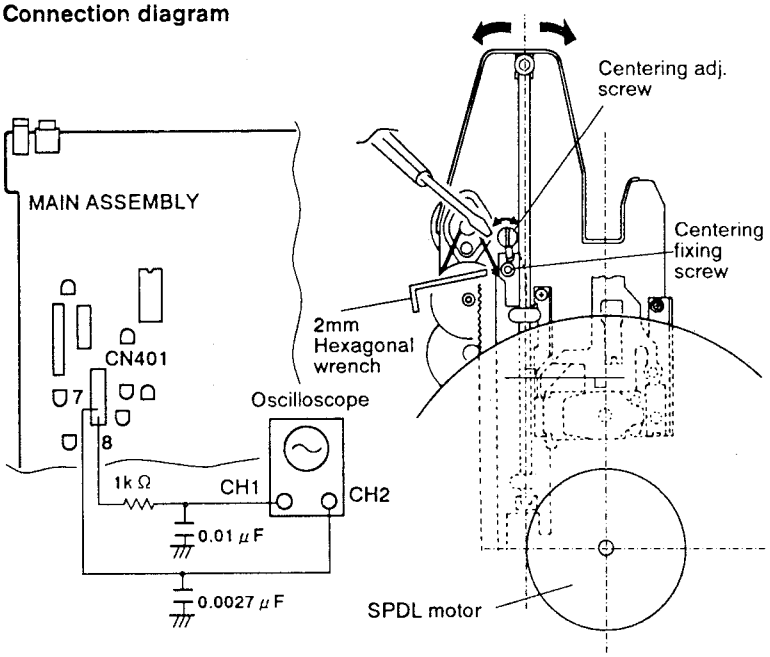
8. VERIFICATION AND ADJUSTMENT OF SPINDLE MOTOR CENTERING

Mechanical Adjustment

- Purpose: Adjustment of the mechanical assembly position to set the spindle motor over the center of the laser beam path when the pickup assembly moves toward the inner or outer periphery of the disc.
- When not properly adjusted: There is track skipping and the search time is long.

• Measuring instruments and jigs: • Measuring point: • Test disc and player mode	• Oscilloscope • Small screwdriver • L.P.F. (0.01 μF + 1k Ω), (0.0027 μF) • 2mm Hexagonal wrench • CH1 : CN401 - 8 (TRK ERR), CH2 : CN401 - 7 (TRK SUM) • 8 - inch LD test disc (GGV1003) • Test Mode (#25,000 still, #3,000 still, TRK servo open, TILT servo ON)
• Positions to be adjusted	• Spindle motor centering adjustment lever

Connection diagram



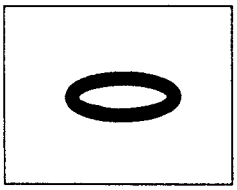


Fig. 1 Frame #25,000 lissajous

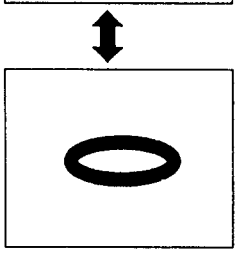


Fig. 2 Frame #3,000 lissajous

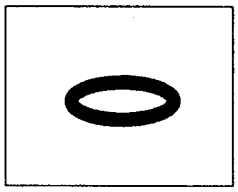


Fig. 3
CD inner periphery lissajous figure

X - Y mode
CH1: 50mV/div.
CH2: 5mV/div. AC

Adjustment Procedure

Note:Adjust the position of the slider shaft against the center line of the SPDL motor in this adjustment.

1. Set the oscilloscope to the X - Y mode and connect CH 1 (X input) and CH 2 (Y input) to CN401 - 8 and CN401 - 7 respectively.
2. Search for frame #25,000 on the test disc and look at the lissajous figure.
3. Search for frame #3,000 and check if the bulge of the lissajous figure is the samed as that of frame #25,000's lissajous figure.

Note : If the bulge of the lissajous waveform in step 3 differs for the inner and outer peripheries, do steps 4 to 6 .

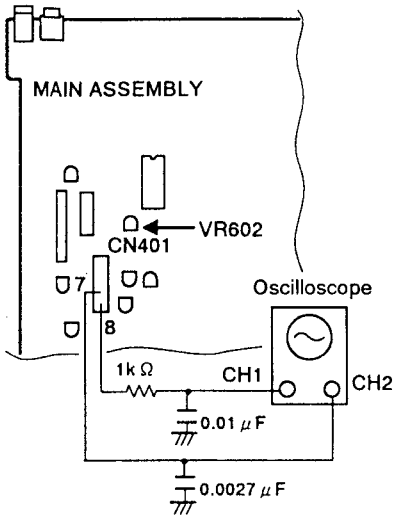
4. Search for frame #25,000 and #3,000 alternately. Loosen a centering fixing screw and adjust the spindle motor centering adjustment screw so that the bulge of the lissajous figures become identical.
5. Change to a compact disc and playback the inner periphery. Check if the lissajous figure is the same as the one shown in Fig. 3.
6. If the compact disc's inner periphery lissajous figure differs from the one shown in Fig. 3, repeat steps 4 to 5.
7. Fix the centering fixing screw.

9. FINE ADJUSTMENT OF GRATING AND TRK BALANCE ADJUSTMENT

- Purpose: Fine adjustment of the grating to direct the two TRK servo laser beams at the disc at the optimum position over the track.
- When not properly adjusted: There is track skipping.

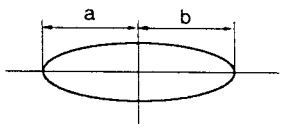
• Measuring instruments and jigs:	• Oscilloscope • Small screwdriver • L.P.F. (0.01 μF + 1k Ω), (0.0027 μF)
• Measuring point:	• CH1 (X) : CN401 - 8 (TRK ERR), CH2 (Y) : CN401 - 7 (TRK SUM)
• Test disc and player mode	• 8 - inch LD test disc (GGV1003) • Test Mode (Play mode, TRK servo loop open, TILT servo ON)
• Positions to be adjusted	• Grating slit in the pickup assembly • VR602

Connection diagram



Set the probe to × 1 only for Y.

- Oscilloscope range:
  CH1 (X): 50mV / div.
  CH2 (Y): 5mV / div. X - Y mode



Frame #3,000
Lissajous figure
Y direction minimum, a=b.

Adjustment Procedure

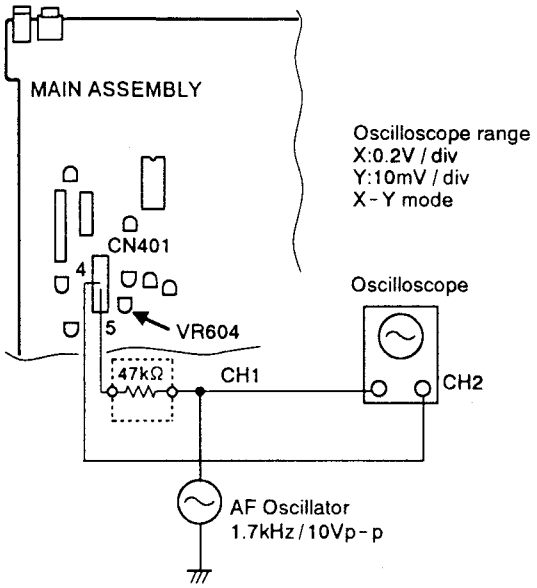
1. Playback the test disc at frame #3,000 (inner periphery) or thereabouts.
2. Set the oscilloscope to the X - Y mode, and connect CN401 - 8 (TRK ERR) and CN401 - 7 (TRK SUM) to the X input and the Y input respectively. Then observe the lissajous figure.
3. Insert the small screwdriver tip into the grating adjustment slit. Fine adjust the grating to minimize the Y direction of the lissajous figure. (Refer to adjustment diagram on page 76.)
4. Check if "a " equals "b" for the lissajous figure. If "a" is not equal to "b", adjust VR602 (TRK BAL).
5. Close the TRK servo loop and check if the image on the TV screen is normal.

10. FCS SERVO LOOP GAIN ADJUSTMENT

- Purpose: Setting the FCS servo's loop gain to the optimum setting.
- When not properly adjusted: Playability is poor.

• Measuring instruments and jigs:	● Oscilloscope ● AF oscillator (1.7kHz / 10Vp-p) ● Resistor (47k Ω)
• Measuring point:	● CH1 (X) : CN401 - 5 (FCS IN), CH2 (Y) : CN401 - 4 (FCS ERR)
• Test disc and player mode	● 8 - inch LD test disc (GGV1003) ● Test Mode (Still mode, TRK servo loop close, TILT servo ON)
• Positions to be adjusted	● VR604

Connection diagram



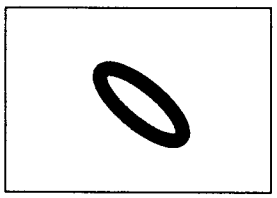


Fig. 1
Inadequate adjustment

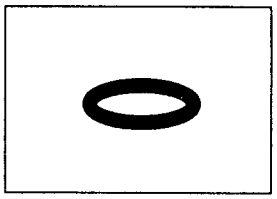


Fig. 2
After adjustment

Adjustment Procedure

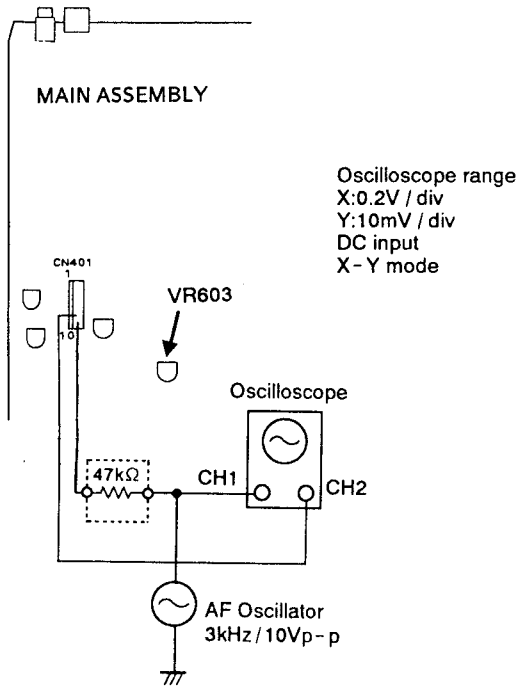
1. Search for frame #15,000 on the test disc.
2. Connect the oscilloscope to CN401 - 4 and CN401 - 5 as shown above.
3. Set the oscilloscope to the X - Y mode and observe the lissajous figure.
4. Adjust VR604 so that the lissajous figure is symmetric with respect to the X and Y axes. (See Fig. 1 and 2.)

11. TRK SERVO LOOP ADJUSTMENT

- Purpose: Optimum setting of the TRK servo's loop gain.
- When not properly adjusted: Playability is poor.

• Measuring instruments and jigs:	• Oscilloscope • AF oscillator (3.0kHz / 10Vp-p) • Resistor (47k Ω)
• Measuring point:	• CH1 (X) : CN401 - 9 (TRK IN), CH2 (Y) : CN401 - 8 (TRK ERR)
• Test disc and player mode	• 8 - inch LD test disc (GGV1003) • Test Mode (Still mode at #15,000 (Black screen), TRK servo closed, TILT servo ON)
• Positions to be adjusted	• VR603

Connection diagram



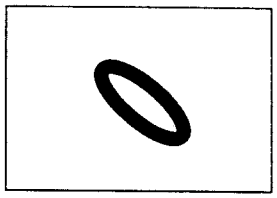


Fig. 1
Inadequate adjustment

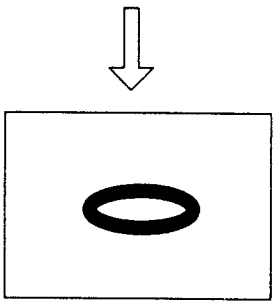


Fig. 2
After adjustment

Adjustment Procedure

1. Search for frame #15,000 on the test disc.
2. Connect the oscilloscope to CN401 - 9 (TRK IN) and CN401 - 8 (TRK ERR) as shown in the diagram below.
3. Set the oscilloscope to the X - Y mode and observe the lissajous figure.
4. Adjust VR603 to make the lissajous figure symmetrical with respect to the X and Y axes. (See Fig. 1 and 2.)

Note : If the waveform is not observable, either change the 47kΩ resitor to 33kΩ or increase the oscillator's output.

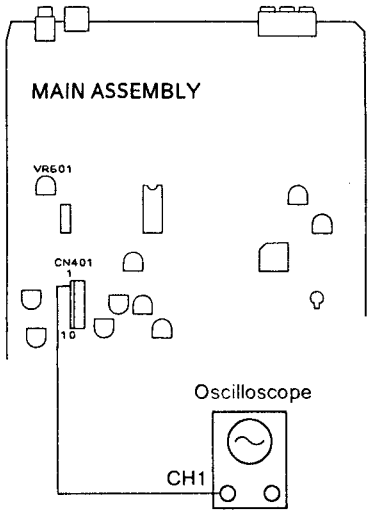
12. RF GAIN ADJUSTMENT

Mechanical Adjustment

- Purpose: Optimum of the RF signal's amplitude.
- When not properly adjusted: There is prominent dropout. Scan and search operations are unstable.

• Measuring instruments and jigs:	• Oscilloscope
• Measuring point:	• CH1 : CN401 - 1 (RF)
• Test disc and player mode	• 8 - inch LD test disc (GGV1003) • Test Mode (Still mode, TRK servo loop close, TILT servo ON)
• Positions to be adjusted	• VR601

Connection diagram



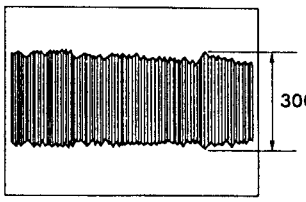


Fig. 1 RF signal

Oscilloscope range
5mV/div
2mS/div
AC mode

Adjustment Procedure

1. Search for frame #15,000 on the test disc.
2. Connect the oscilloscope to CN401 - 1 (RF) and observe the RF signal.
3. Adjust VR601 so that the RF signal's amplitude becomes 300mV ± 50mV. (See Fig. 1.)

8.4.5 ELECTRICAL ADJUSTMENT

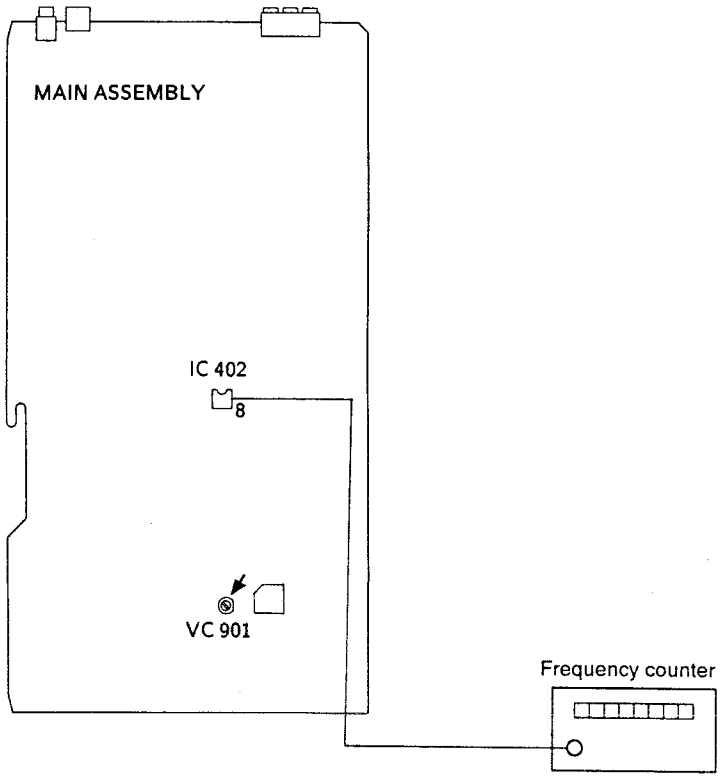
13. Ref. SUB CARRIER ADJUSTMENT

Electrical Adjustment

- Purpose: Adjustment of the standard clock frequency.
- When not properly adjusted: Incorrect color tint, no TV color lock.

• Measuring instruments and jigs: • Measuring point: • Test disc and player mode	• Frequency counter • Oscilloscope 10:1 probe • IC402 (PM0001) pin 8 • Normal mode (Stop mode (Blueback screen))
• Positions to be adjusted	• VC901

Connection diagram



Adjustment Procedure

1. Adjust VC901 on the MAIN assembly so that the frequency of IC402 pin 8 becomes 3.579545MHz in the stop mode (blueback screen).

Note : The frequency counter probe should be an oscilloscope 10 : 1 probe.

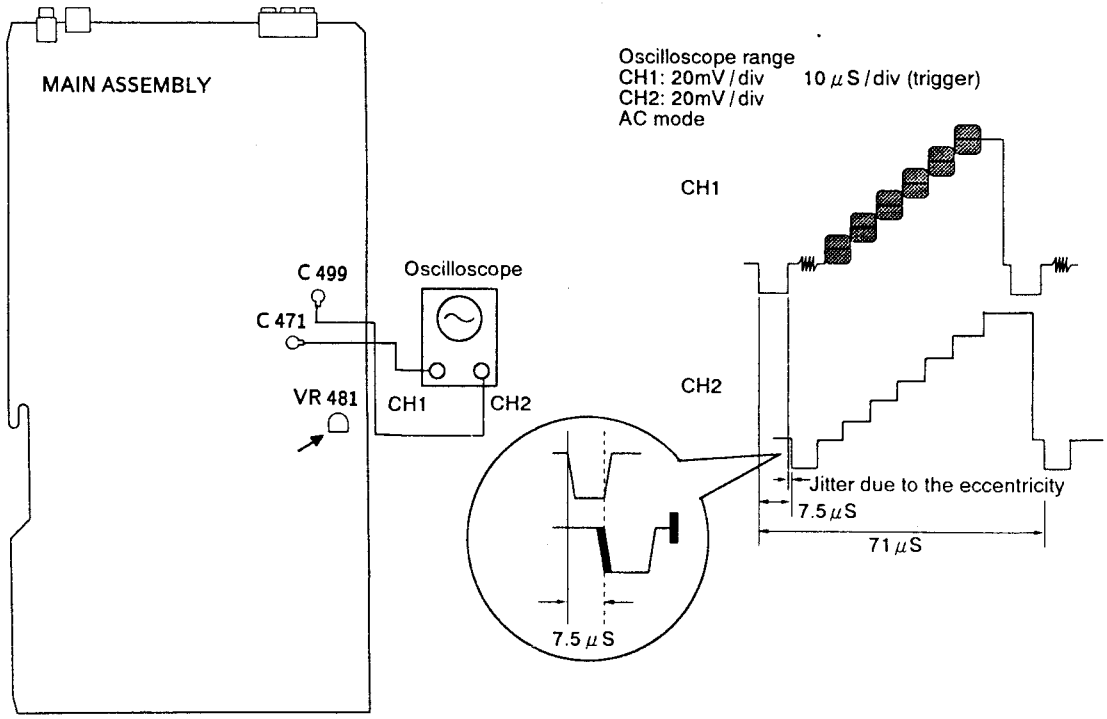
14. VCO CENTER FREQUENCY ADJUSTMENT

Electrical Adjustment

- Purpose: Setting the optimum delay time for the time base error compensation CCD.
- When not properly adjusted: Difficult to color lock, there is color lock delay after a search, and flicker on the white screen.

• Measuring instruments and jigs:	● Oscilloscope
• Measuring point:	● CH 1 : + side lead wire of C471. ● CH 2 : + side lead wire of C499.
• Test disc and player mode	● 8-inch LD test disc (GGV1003) ● Normal mode (Still mode)
• Positions to be adjusted	● VR481

Connection diagram



Adjustment Procedure

1. Connect the + side lead wire of C471 and the + side lead wire of C499 to CH 1 and CH 2 of the oscilloscope respectively.
   CH 1 : Video signal before time axis error compensation.
   CH 2 : Video signal after time base error compensation.

2. Search for frame #5,100 on the test disc. Adjust VR481 so that the center of CH 1's video signal jitter is delayed by 71 μs (1H + 7.5 μs) with respect to the CH 2's video signal.

Note : Do not confuse CH 1 and CH 2.

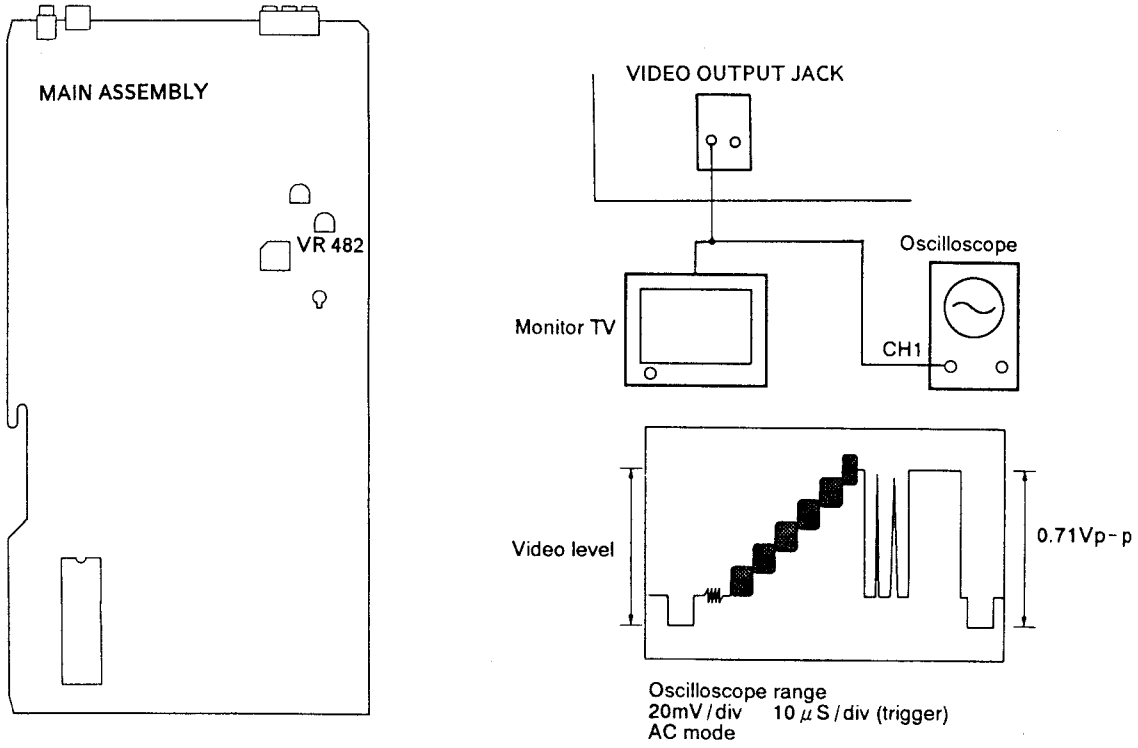
15. OUTPUT VIDEO LEVEL ADJUSTMENT

Electrical Adjustment

- Purpose: Setting the video signal level to 1Vp-p (75 Ω termination).
- When not properly adjusted: The player starts up midway without reading the data. The screen is too bright or too dark.

• Measuring instruments and jigs:	• Oscilloscope
• Measuring point:	• Player's VIDEO OUT terminal
• Test disc and player mode	• 8-inch LD test disc (GGV1003) • Normal mode (Still mode, #19,900)
• Positions to be adjusted	• VR482

Connection diagram



Adjustment Procedure

Note : Since the VIDEO OUT terminal is connected to a TV monitor, it is to have 75Ω termination. (If it is connected to a TV via VHF OUT, terminate the VIDEO OUT terminal with a 75Ω resistor).

1. Search for frame #19,900 on the test disc.
2. Adjust VR482 so that the white level becomes 0.71Vp-p ± 5% from the video signal's sync tip level.

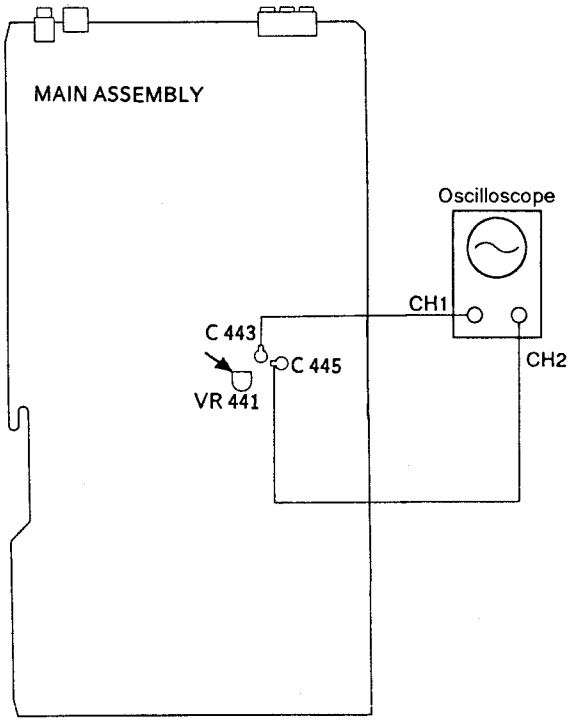
16. 1H DELAY VIDEO LEVEL ADJUSTMENT

Electrical Adjustment

- Purpose: Equalization of the video levels of the 1H delay video signal and the main line video signal.
- When not properly adjusted: If the 1H delay video signal level is high, white dropout will be noticeable and there will be H shifting. (Horizontal stripes across the screen.)

• Measuring instruments and jigs:	● Oscilloscope
• Measuring point:	● CH 1 : – side lead wire of C443 ● CH 2 : – side lead wire of C445
• Test disc and player mode	● 8-inch LD test disc (GGV1003) ● Normal mode (Still mode)
• Positions to be adjusted	● VR441

Connection diagram



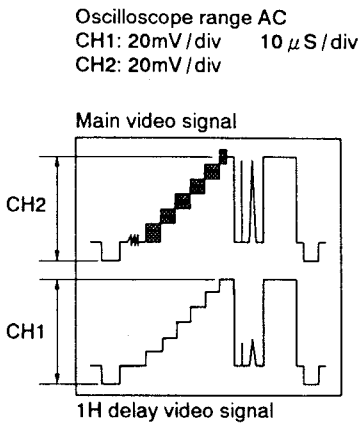


Fig. 1

Adjustment Procedure

1. Search for frame #3,800 on the test disc.
2. Connect – side lead wire of C443 to the oscilloscope's CH 1 and – side lead wire of C445 to the CH 2.
3. Adjust VR441 so that the 1H delay video level (CH 1) becomes the same as the main line video level (CH 2). (See Fig. 1)

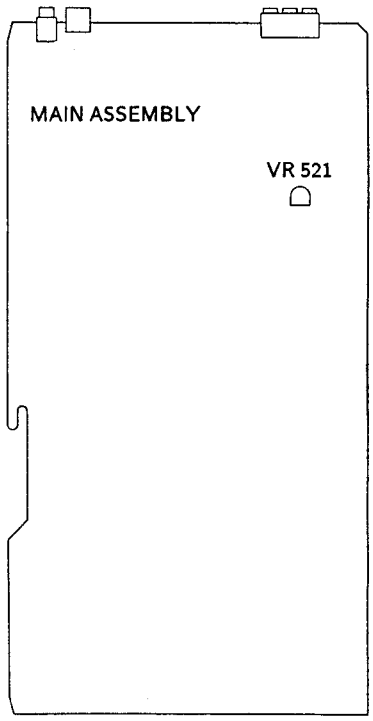
Note : The video level is the level between the SYNC tip and the white peak.

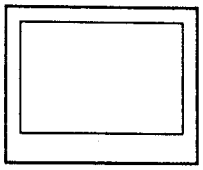
17. VPS ERROR ADJUSTMENT

- Purpose: Optimization of the color tint compensation section's error signal level.
- When not properly adjusted: Substantial color irregularity. (especially on CDV.)

• Measuring instruments and jigs:	• TV monitor
• Measuring point:	
• Test disc and player mode	• 8-inch LD test disc (GGV1003) • Normal mode (Still mode)
• Positions to be adjusted	• VR521

Connection diagram



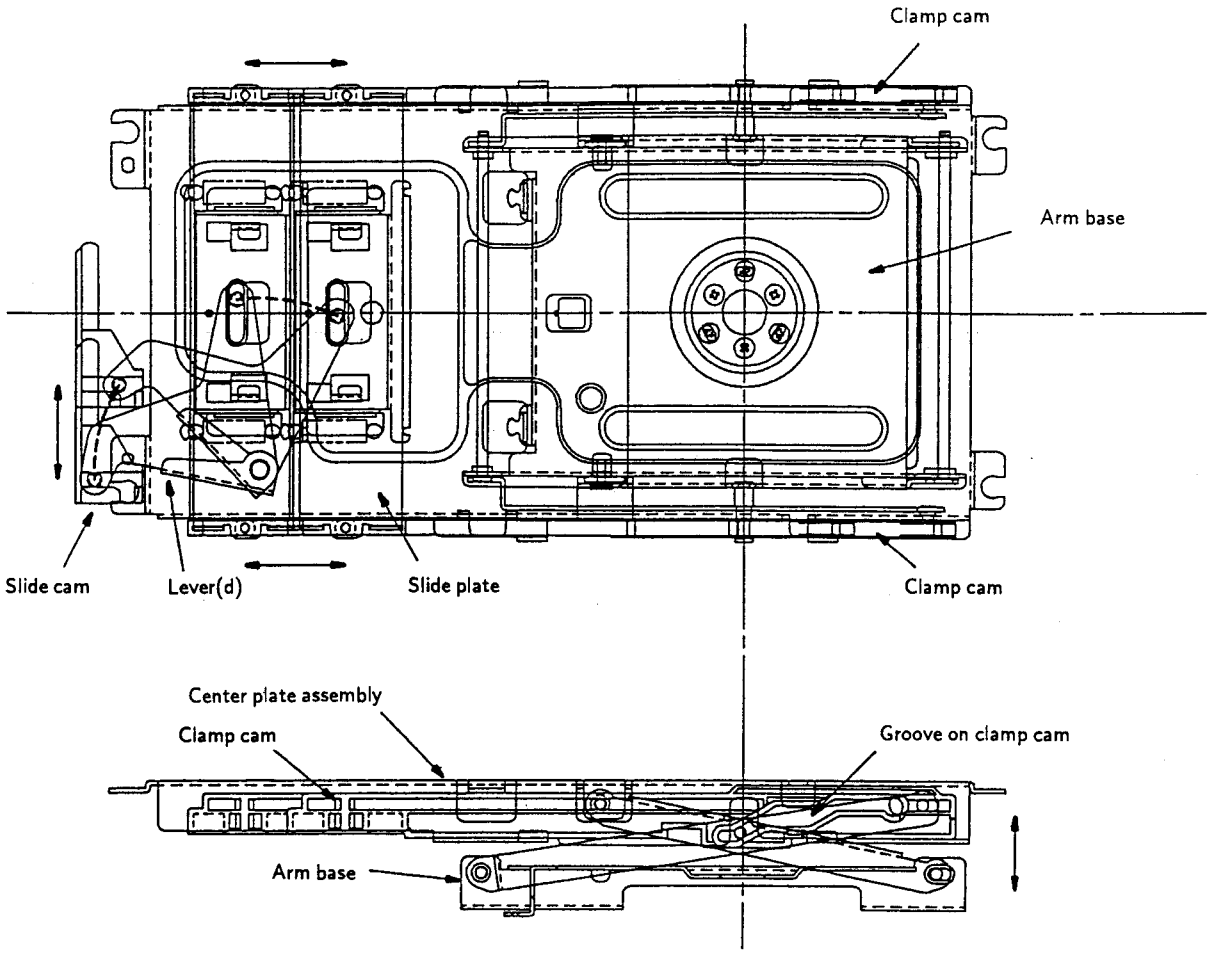


Color irregularity on the magenta screen is minimized.

Adjustment Procedure

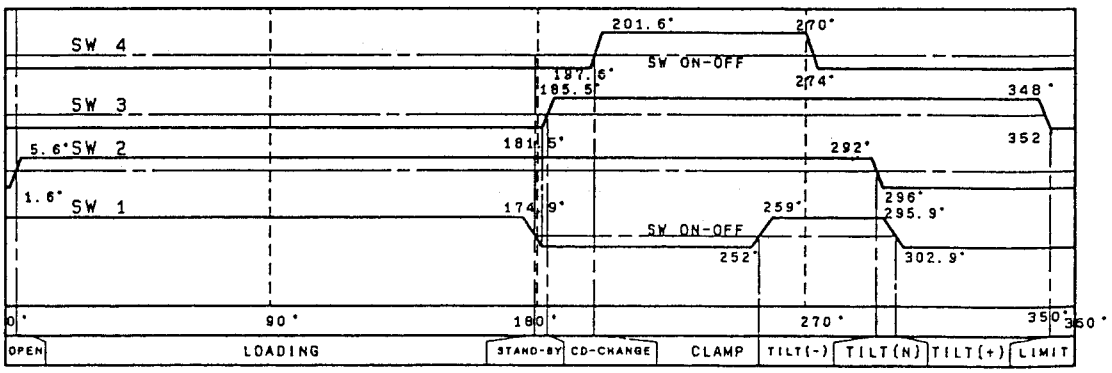
1. Search for frame #8,000 on the test disc. (Magenta screen)
2. Adjust VR521 untill the color irregularity on the magenta screen is minimized.

9. MECHANICAL DESCRIPTION



9.1 ARM HEIGHT MECHANISM

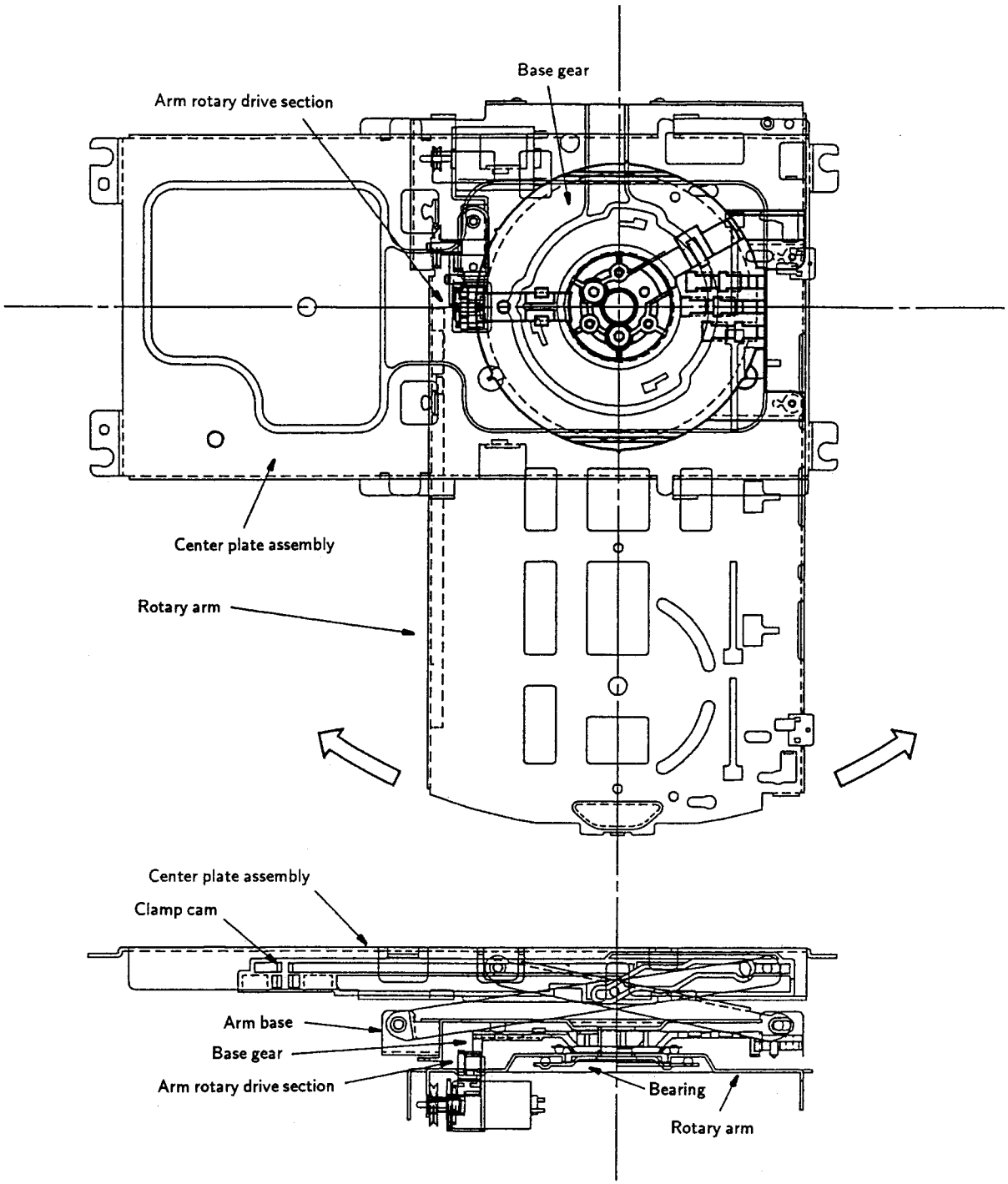
When the loading motor moves the slide cam up and down as shown in the fig. above, lever (D) begins rotating to move the slide plate horizontally. This operation then causes a pair of clamp cams to move right and left synchronously.
At this point, the link starts rotating along the groove on the clamp cam and the arm base connected to the link moves vertically. This movement causes the rotary arm (that is supported by the base gear which is fixed to the arm base for rotation) to move vertically.



Operational Flow Chart of Loading Motor

9.2 ARM ROTARY MECHANISM

The rotary arm is supported by the ball bearing which fits it to a position that can be rotated with the base gear fixed to the arm base. The arm rotary drive section mounted on the rotary arm rotates, then runs along the rack on the circumference of the base gear, centering on the bearing.

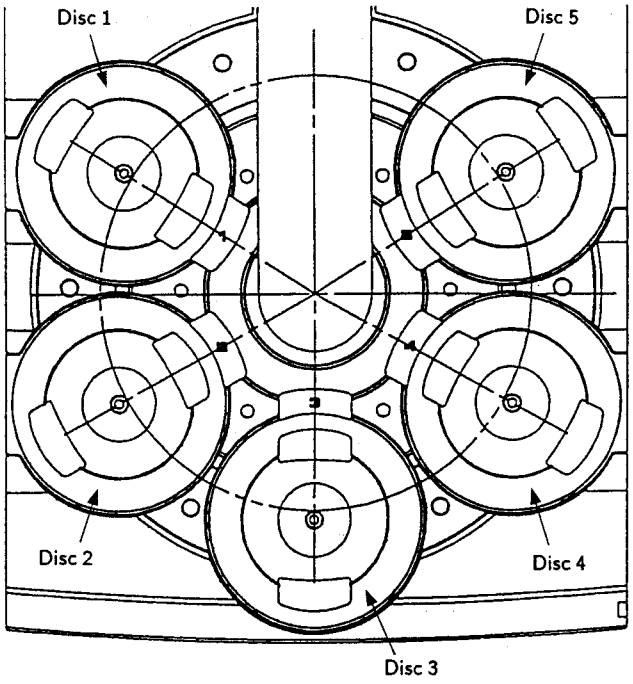


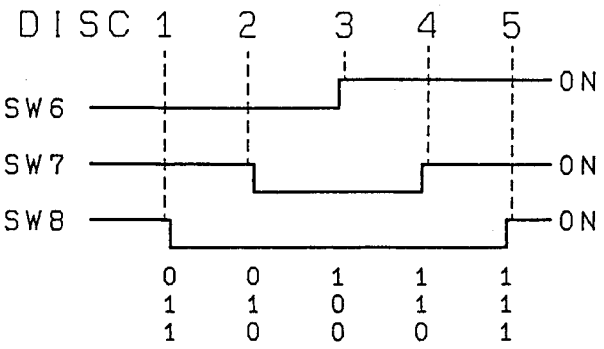
9.3 DETECTION OF ARM ROTATION POSITION

The arm rotation position is detected by combination of the codes for three switches (SW 6, SW 7 and SW 8) as shown in SW cam operation chart. When the rotary arm rotates, the three SW levers moves horizontally along the three grooves on the SW cam, causing SW 6, SW 7 and SW 8 to turn ON and OFF.

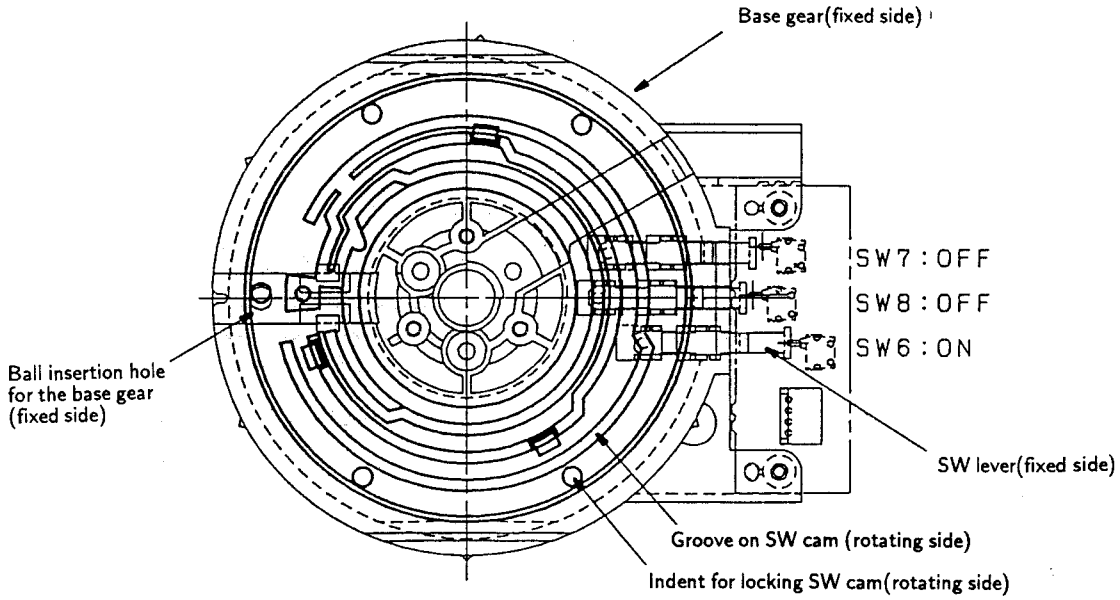
9.4 POSITIONING OF ARM ROTATION : BALL LOCK

Approximate positioning for arm rotation are performed electrically by combination of the codes of the three switches (SW6, SW7 and SW8). Also, precise positioning is performed by the ball mounted on the insertion hole on the base bear when this ball is fit into the dent (corresponding to the angle for the 5 CD fixed positions) on the SW cam.



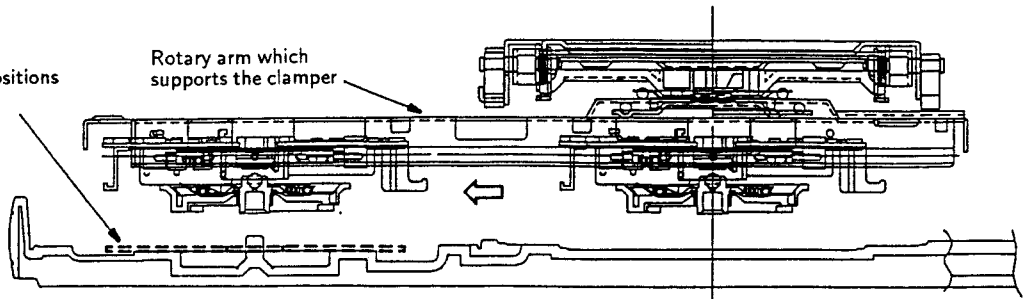


SW Cam Operation Chart


Base gear(fixed side)
SW7 : OFF
SW8 : OFF
SW6 : ON
Ball insertion hole for the base gear (fixed side)
SW lever(fixed side)
Groove on SW cam (rotating side)
Indent for locking SW cam(rotating side)

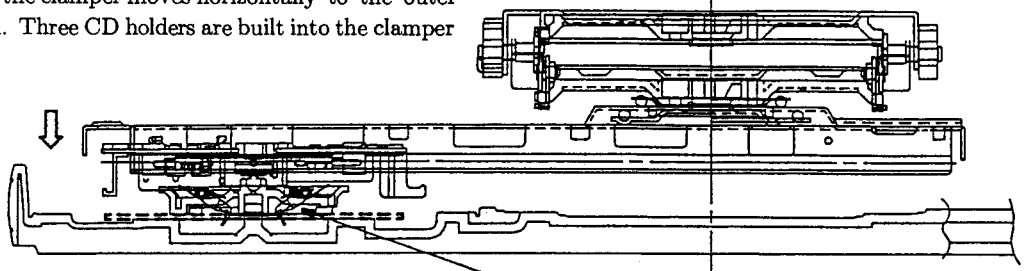
Configuration at DISC : 3 Position

9.5 CD movement mechanism (PLAY)



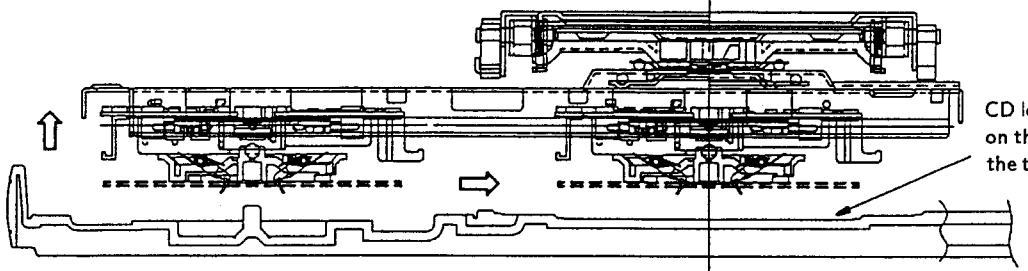
<1> Clamper : Moving outward

When the carriage motor rotates with the CD holders set in the original position, the clamper moves horizontally to the outer CD fixed position. Three CD holders are built into the clamper



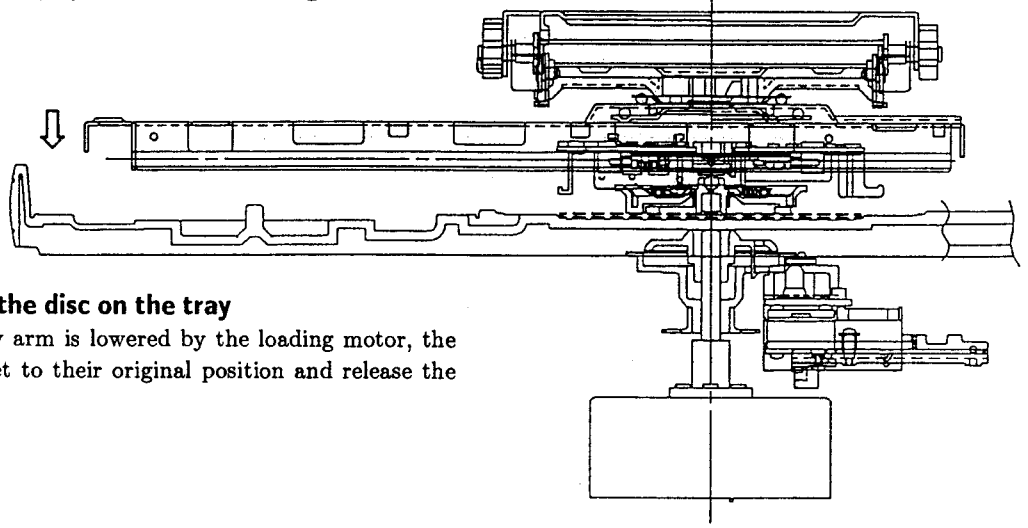
<2> Picks up the disc on the tray

When the rotary arm is lowered by the loading motor, the CD holders are opened by rotation of the carriage motor to pick up the center section of the disc.



<3> Clamper : moves inward

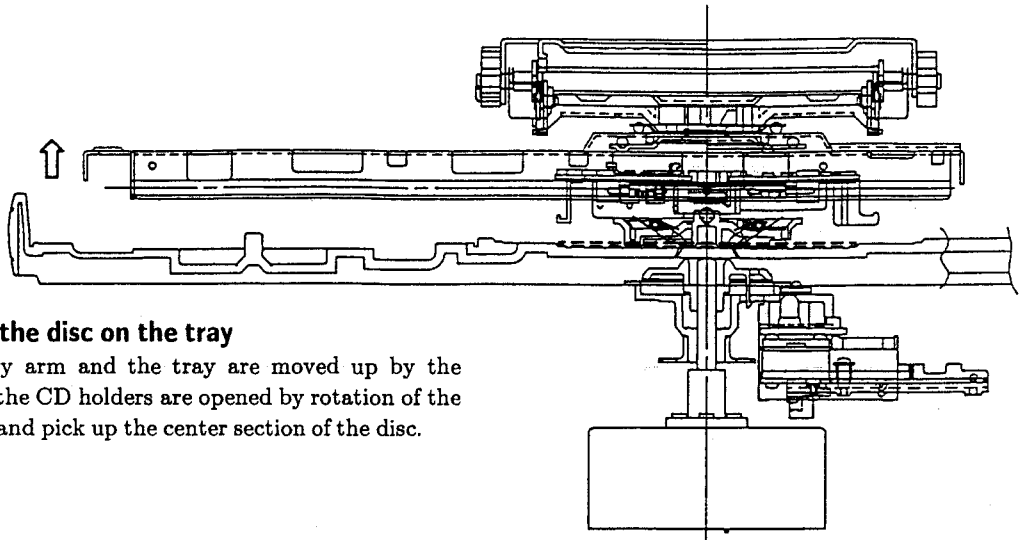
After the loading motor moves the rotary arm up with the disc clamped at the inter diameter, the disc is positioned in the center of the tray by rotation of the carriage motor.



<4> Releases the disc on the tray

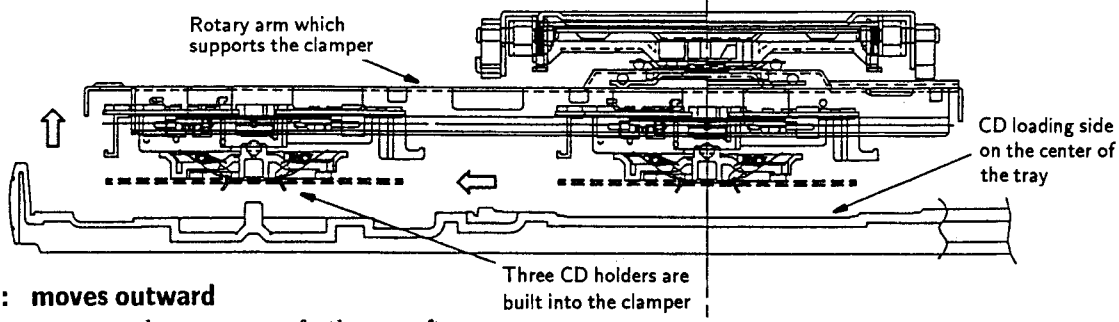
After the rotary arm is lowered by the loading motor, the CD holders reset to their original position and release the disc.

9.6 CD MOVEMENT MECHANISM (STOP)



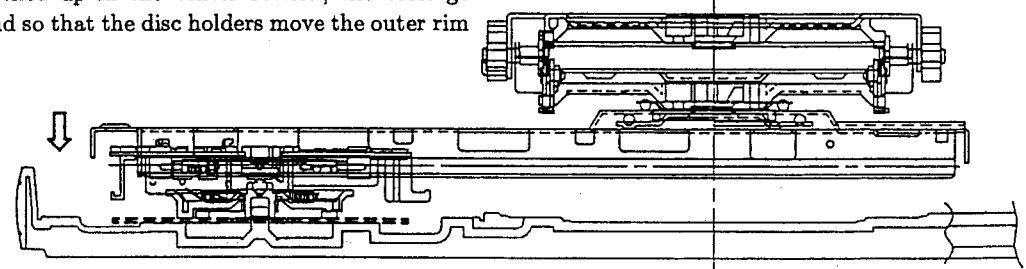
<5> Picks up the disc on the tray

After the rotary arm and the tray are moved up by the loading motor, the CD holders are opened by rotation of the carriage motor and pick up the center section of the disc.


Rotary arm which supports the clamper
CD loading side on the center of the tray
Three CD holders are built into the clamper

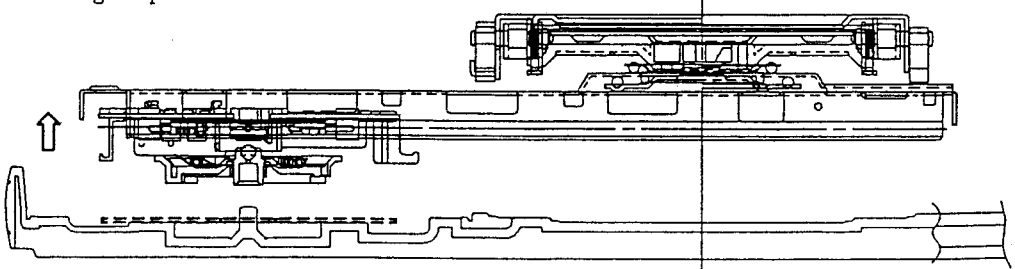
<6> Clamper : moves outward

When loading motor moves the rotary arm further up after the disc is picked up in the center section, the carriage motor turns and so that the disc holders move the outer rim of the disc.



<7> Releases the disc on the tray

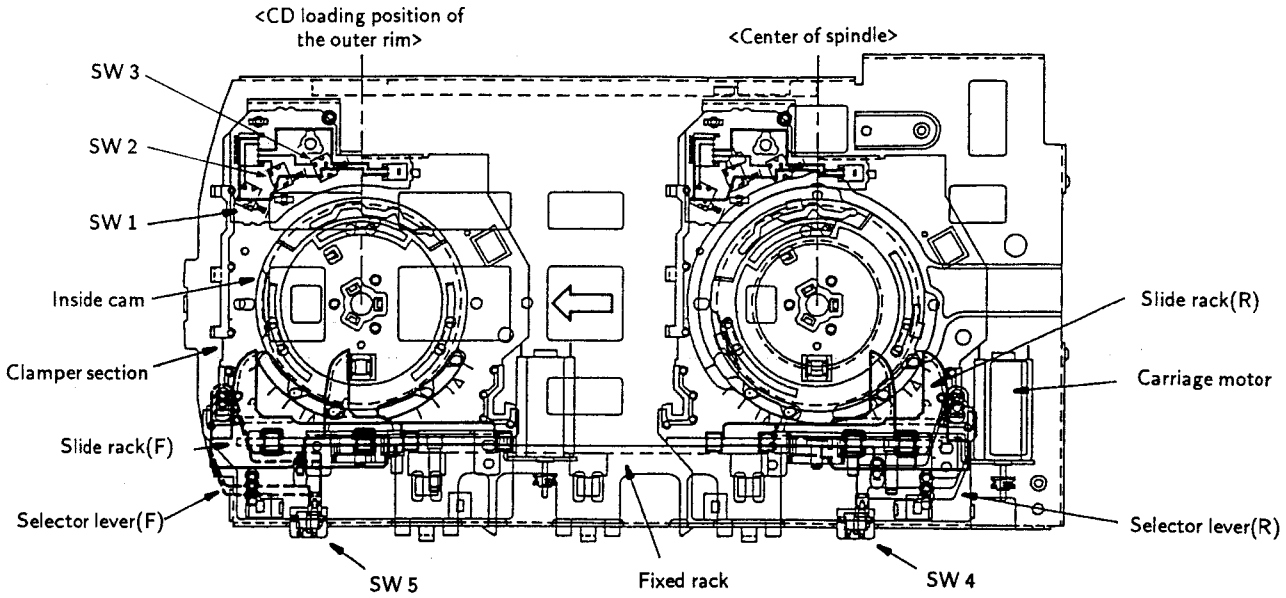
After the loading motor lowers the rotary arm, the CD holders reset to their original positions and release the disc.



<8> Clamper: Stands by at outer section of the disc.

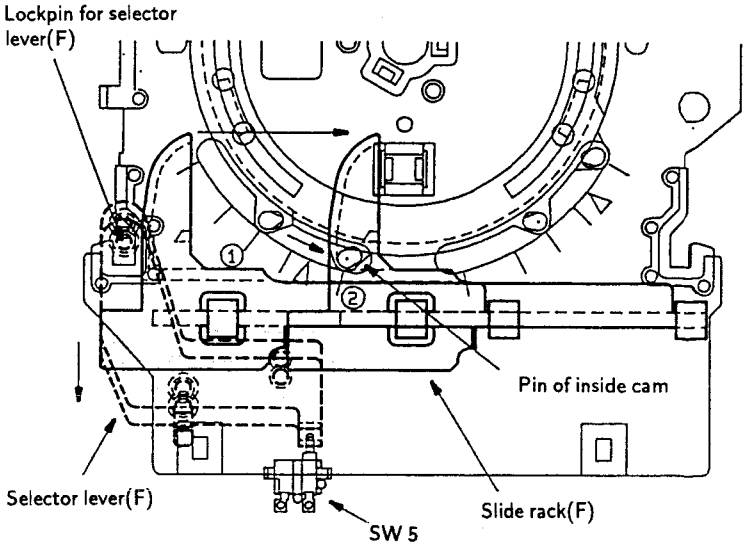
When the loading motor moves the rotary arm upward with the CD holder positioned at the original position, the clamper is positioned at the outer rim of the disc and set for standby.

9.7 CD DRIVE MECHANISM (PLAY)



<1> Clamper moves to outer rim

The carriage motor moves the clamper on the fixed rack, then the clamper is locked by the selector lever (F). This moves the slide rack (F) to the right. When the selector lever (F) is switched, SW 5 turns ON to detect that the clamper is positioned at the outer rim.



<2> Picks up disc

When the slide rack (F) moves, the pin for the inside cam is rotated to position (2). This open the three CD holders built into the clamper are open to clamp the disc.

This state is detected by turning ON/OFF of SW 1, SW 2 and SW 3 by the lever rotated by the inside cam.

<3> Clamper moves to inner rim

After the CD holders clamp the disc, the carriage motor rotates in reverse and the slide cam (F) moves to the left. But the inside cam does not rotate and the CD holders continue to clamp the disc.

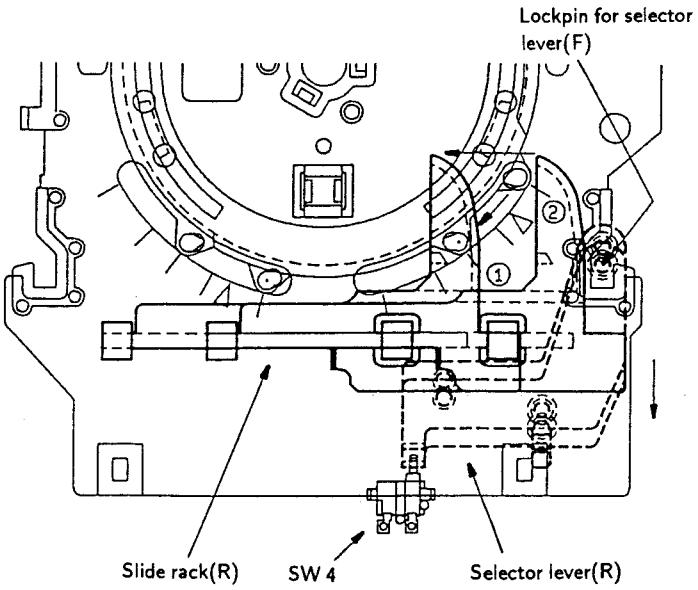
When the side rack (F) moves to the left end, the selector lever (F) locks the slide rack (F). At this time, the carriage motor moves the clamper to inner rim over the fixed rack.

<4> Releases the disc

When the clamper moves to the center, the selector lever (R) moves to lock the clamper. At this time, the slide rack (R) moves to the left. The selector (R) turns SW 4 ON to detect that the clamper is positioned at the center.

When the slide rack (R) moves to rotate the pin for the inside cam to position (1), the three CD holders built into the clamper close to release the disc.

This state is detected when the SW 1, SW 2 and SW 3 are turned ON and OFF by the lever rotated by rotation of the inside cam.

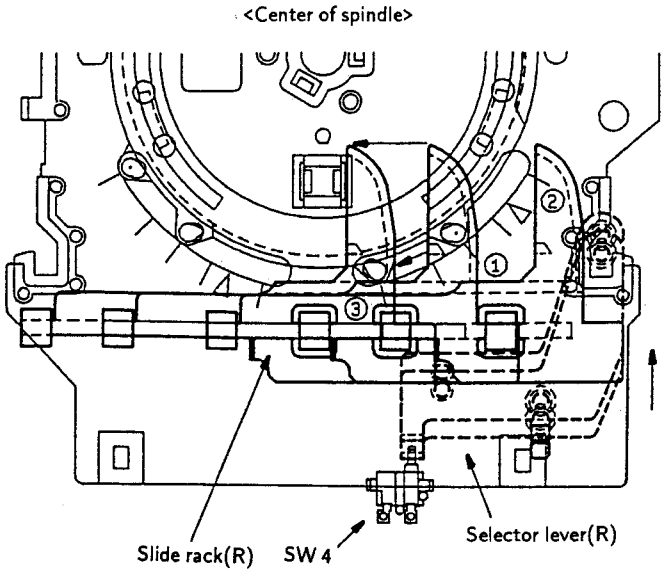


9.8 CD DRIVE MECHANISM (STOP)

<5> Clamps the disc

When clamping the disc at the inner rim, the carriage motor moves the slide rack (R) to the left, causing the pin for the inside cam to rotate to position (3). Then the three CD holders built into the clamper open to clamp the disc.

This state is detected when SW 1, SW 2 and SW 3 are turned ON and OFF by the lever rotated by rotation of the inside cam.



<6> Clamper moves to the outer rim

After the clamper picks up the CD, the carriage motor rotates in reverse to move the slide rack (R) to the right. But the inside cam does not rotate and continues to clamp the disc.

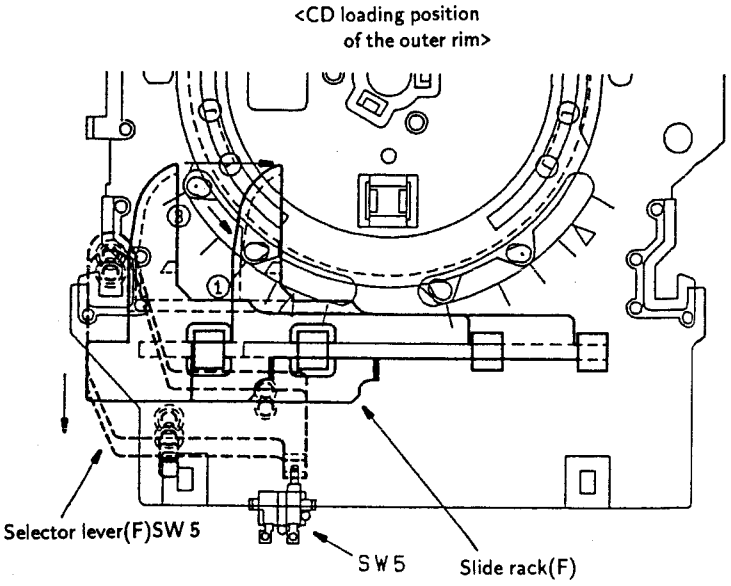
When the slide rack (R) moves to the right end, the selector lever (R) locks the slide rack (R) to releases the clamper, then the carriage motor moves the clamper over the fixed rack outward.

<7> Releases the disc

When the clamper reaches the center rim, the selector lever (F) moves to lock the clamper. At this time, the slide rack (F) will move to the right. The selector lever (F) turns SW 5 ON to detect that the clamper is positioned at outer rim.

When the slide rack (F) moves causing the pin for the inside cam to rotate to position (1), the three CD holders built into the clamper close to release the disc.

This state is detected when SW 1, SW 2 and SW 3 are turned ON and OFF by the lever turned by the rotation of the inside cam.



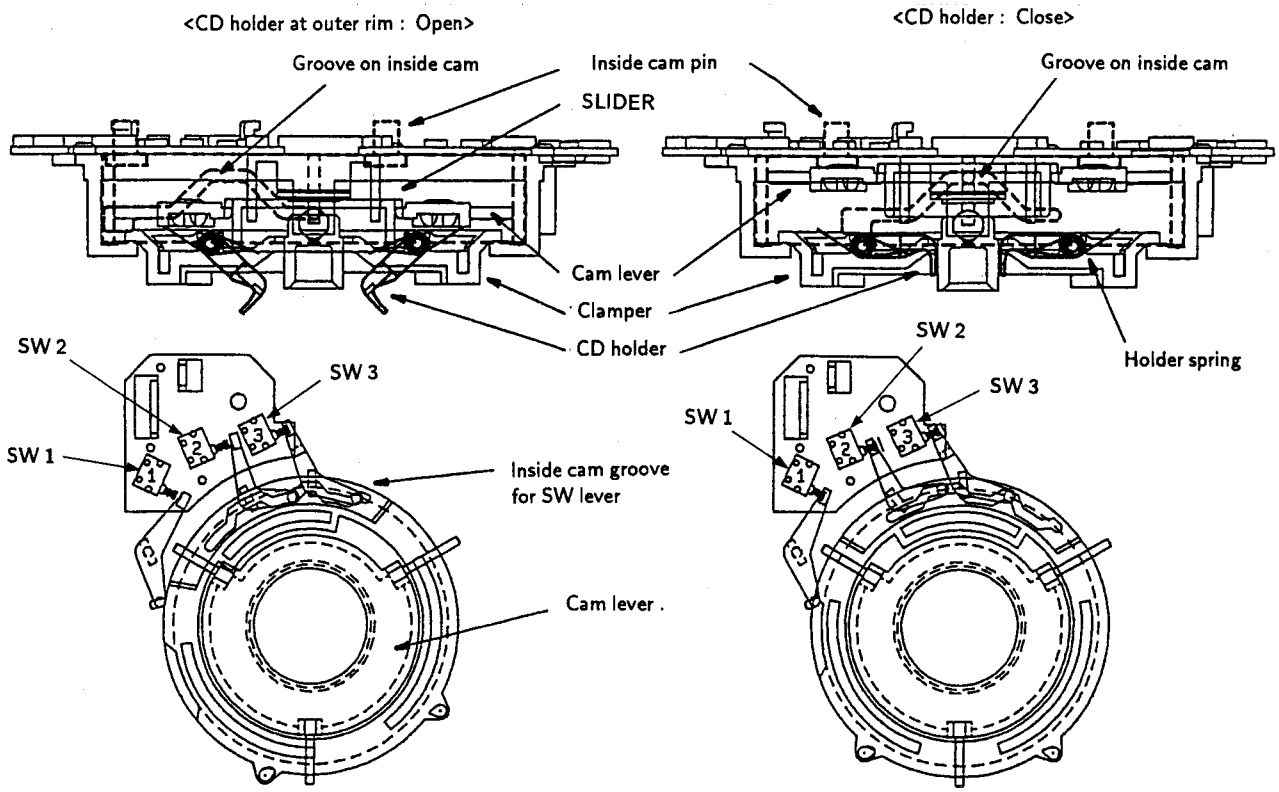
9.9 CD HOLDER OPEN/CLOSE MECHANISM

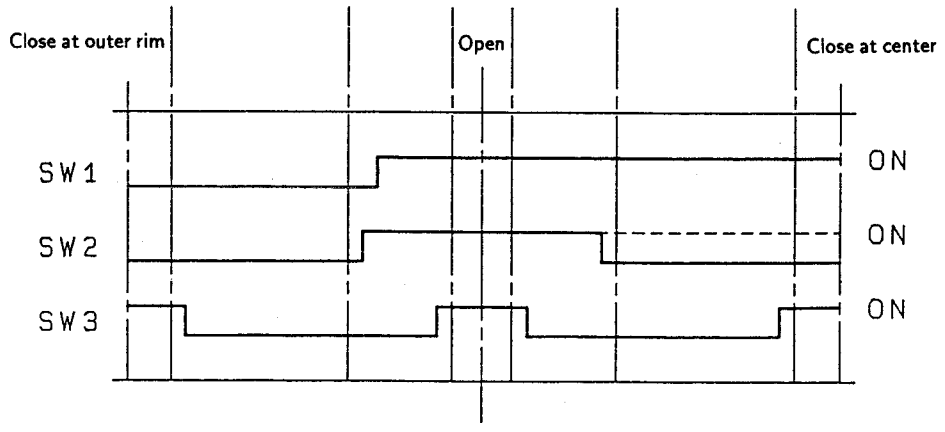
<CD holder open/close mechanism>

The three CD holders built into the clamper are usually locked to the close direction by the holder springs. The CD holders are opened and closed when the inside cam rotates to move the cam lever along the cam groove and the slider moves up and down.

<CD holder operation position detection>

The positional detection for open/close operation of the CD holders are performed by combination of the codes generated by SW 1, SW 2 and SW 3 which turn ON and OFF by the three levers rotating in the groove on the inside cam.



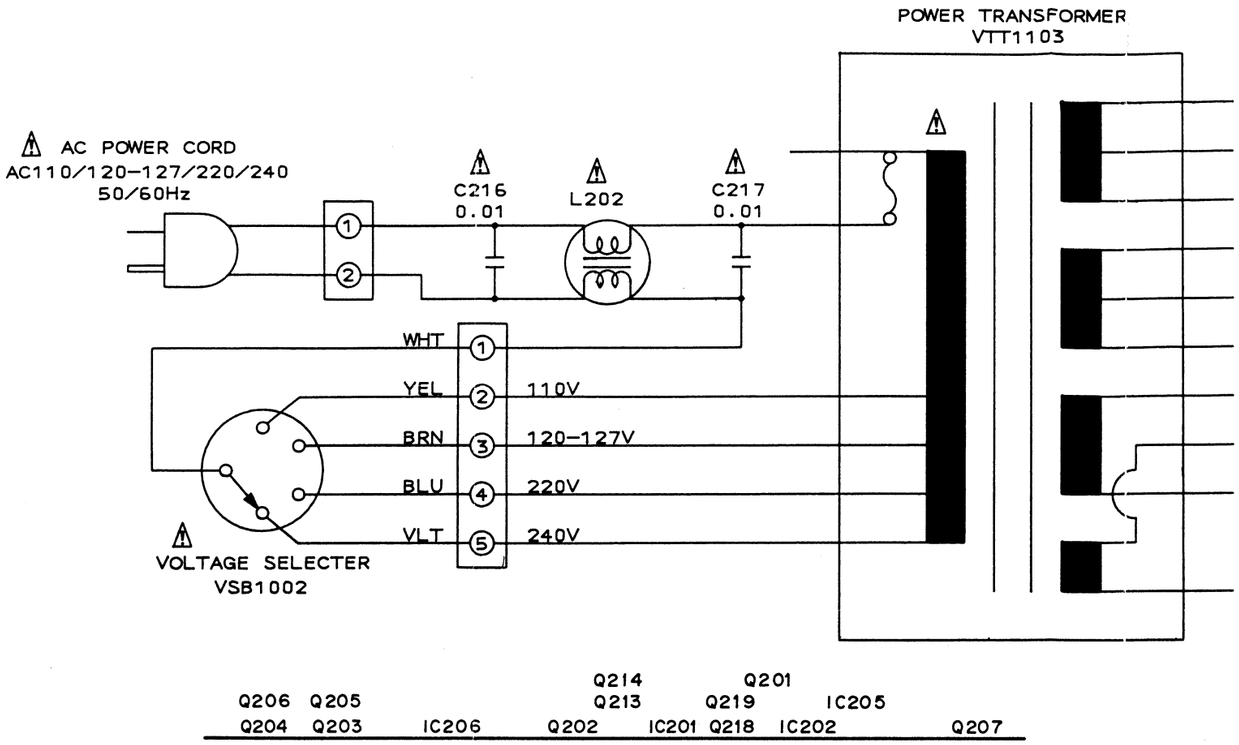


CD Holder Open/Close Flow Chart

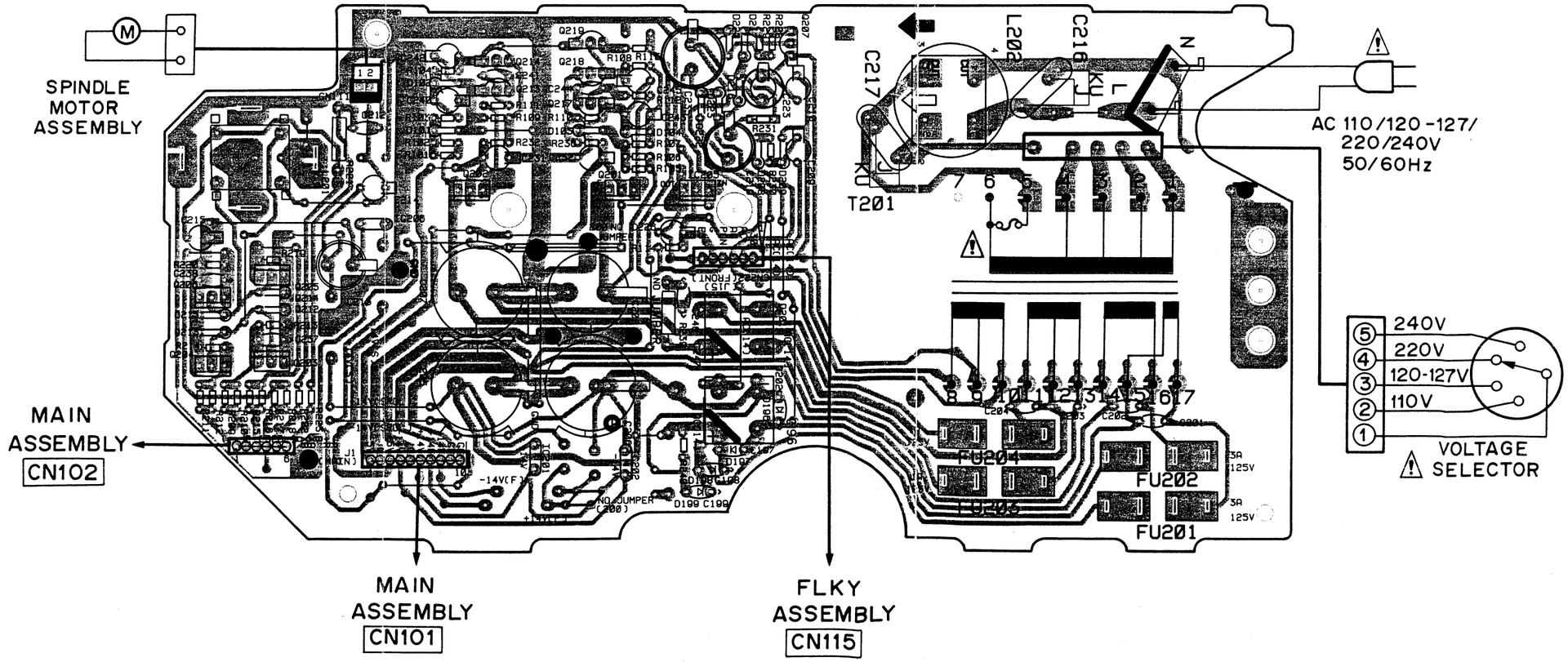
9.10 Specification

MODEL NO.	CLD-M 90
	KUC
MP	'91/6~7
Description	MULTI CLD
Colour	Black/Gray
RCU	Normal (35 key)
Audio Characteristics	
Digital filter	8 fs, 20 bit
D/A converter	1-bit
FREQ. response 4-20 K	(±0.5 dB)
Audio S/N	(110 dB)
Dynamic range	(99 dB)
Channel separation	(100 dB)
T.H.D	(0.002%)
Wow and flutter	Unmeasurable
Video Characteristics	
Comb filter	×
Digital TBC	×
Horizontal resolution	425 lines
Video S/N	(49 dB)
Outputs	
VHF adapter output	○
# S-VIDEO output	×
# VIDEO output	2
# AUDIO output	2
Digital output	×
Control In/Out SR	○
CD-DECK synchro	○
Headphone jack	○

Main Functions	
Direct CD	VIDEO PWR OFF
CD Peak search	×
Single play	×
Last memory	○
PGM EDIT/COMPU PGM EDIT	○
Random play	○
5-CD random play	○
RCU Power on/off	○
New CD level meter	○
Shuttle for CLEAR SCAN	×
Video NR	×
Intro/Hilite scan	2-mode Hilite
Program play	24-step
Music calendar	FL/OSD
ADLC	○
Volume control	×



SYPS ASSEMBLY (VWR1114)



10. FOR SD TYPE

• CONTRAST OF MISCELLANEOUS PARTS

NOTES :

- *Parts without part number cannot be supplied.*
- *Parts marked by "◉" are not always kept in stock. Their delivery time may be longer than usual or they may be unavailable.*
- *The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.*

The CLD-M90/SD type is the same as the CLD-M90/KUC type with the exception of the following sections.

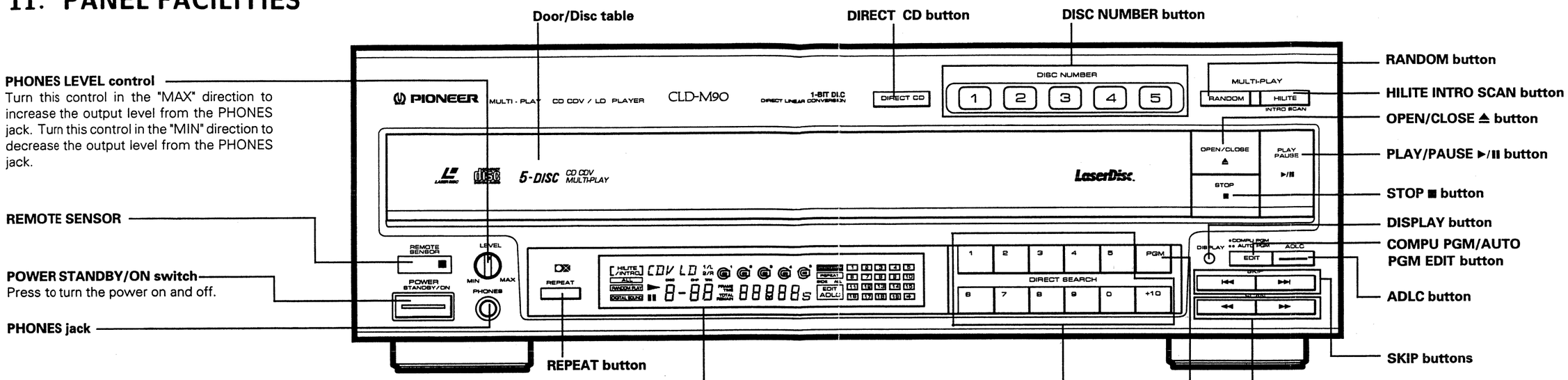
Mark	Symbol & Description	Part No.		Remarks
		KUC	SD	
◉	SYPS assembly	VWR1108	VWR1114	
	Strain relief	CM-22C	CM-22B	
⚠	AC power cord	PDG1015	PDG1013	
⚠	Line voltage selector (AC 110/120-127/220/240 V)	.....	VSB1002	
⚠	Power transformer (AC 120 V)	VTT1096	.....	
⚠	Power transformer (AC 110/120-127/220/240 V)	.....	VTT1103	
	Packing case	VHG1168	VHG1191	For packing
	Operating instructions (Spanish)	.....	VRK1002	

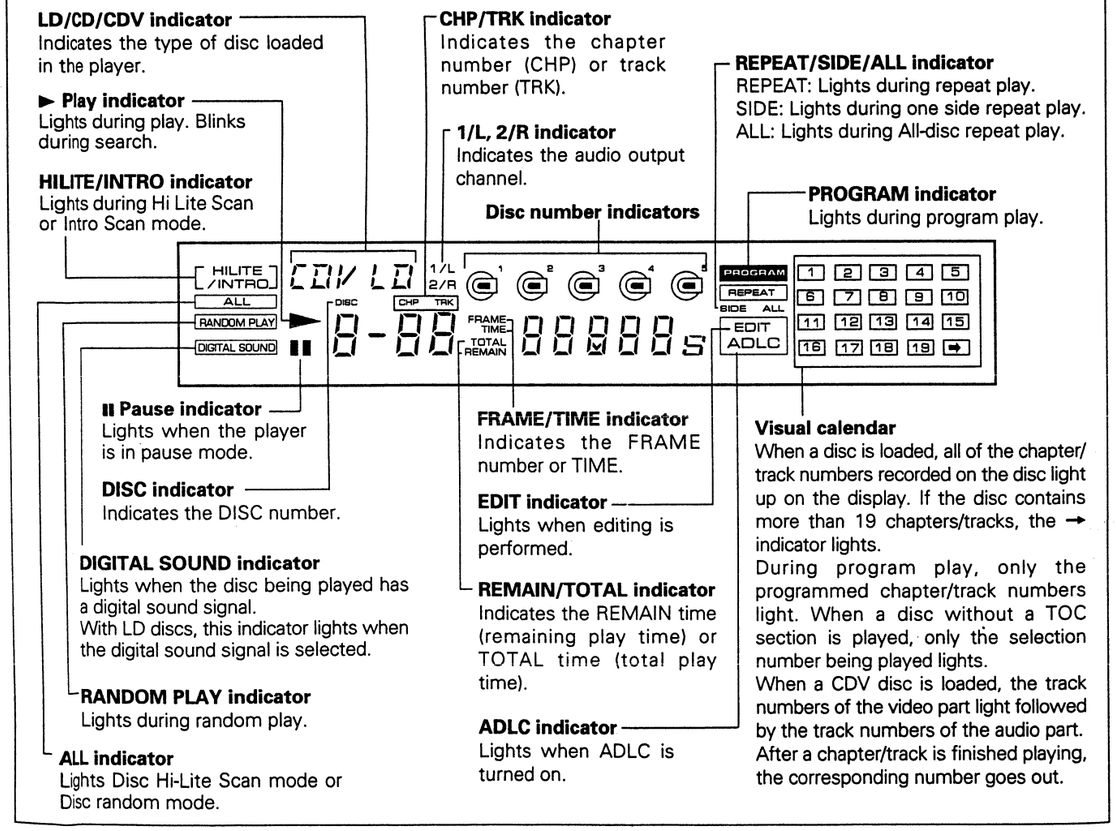
SYPS ASSEMBLY(VWR1114)

The SYPS assembly (VWR1114) is the same as the SYPS assembly (VWR1108) with the exception of the following sections.

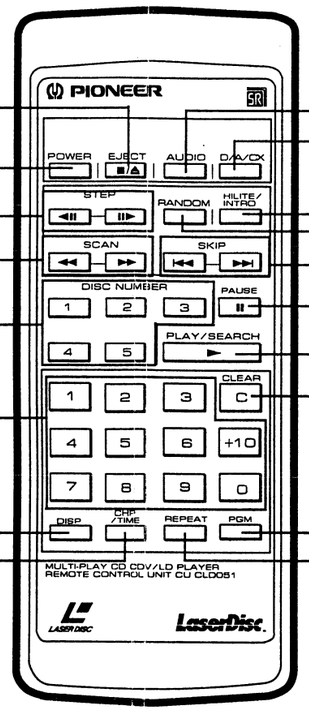
Mark	Symbol & Description	Part No.		Remarks
		VWR1108	VWR1114	
	R241	RD1/2PM225J	.....	

11. PANEL FACILITIES




LD/CD/CDV indicator
Indicates the type of disc loaded in the player.
► Play indicator
Lights during play. Blinks during search.
HILITE/INTRO indicator
Lights during Hi Lite Scan or Intro Scan mode.
CHP/TRK indicator
Indicates the chapter number (CHP) or track number (TRK).
1/L, 2/R indicator
Indicates the audio output channel.
Disc number indicators
REPEAT/SIDE/ALL indicator
REPEAT: Lights during repeat play.
SIDE: Lights during one side repeat play.
ALL: Lights during All-disc repeat play.
PROGRAM indicator
Lights during program play.
II Pause indicator
Lights when the player is in pause mode.
DISC indicator
Indicates the DISC number.
DIGITAL SOUND indicator
Lights when the disc being played has a digital sound signal.
With LD discs, this indicator lights when the digital sound signal is selected.
RANDOM PLAY indicator
Lights during random play.
ALL indicator
Lights Disc Hi-Lite Scan mode or Disc random mode.
FRAME/TIME indicator
Indicates the FRAME number or TIME.
EDIT indicator
Lights when editing is performed.
REMAIN/TOTAL indicator
Indicates the REMAIN time (remaining play time) or TOTAL time (total play time).
ADLC indicator
Lights when ADLC is turned on.
Visual calendar
When a disc is loaded, all of the chapter/track numbers recorded on the disc light up on the display. If the disc contains more than 19 chapters/tracks, the → indicator lights.
During program play, only the programmed chapter/track numbers light. When a disc without a TOC section is played, only the selection number being played lights.
When a CDV disc is loaded, the track numbers of the video part light followed by the track numbers of the audio part.
After a chapter/track is finished playing, the corresponding number goes out.
HILITE /INTRO
ALL
RANDOM PLAY
DIGITAL SOUND
CDV LD
DISC
CHP TRK
1/L 2/R
FRAME TIME
TOTAL REMAIN
PROGRAM
REPEAT
SIDE ALL
EDIT
ADLC

Remote control buttons with the same names or marks as buttons on the front panel of the player control the same operations as the corresponding front panel buttons.



EJECT button

POWER button
Press to turn the power on and off.

STEP buttons

SCAN buttons

DISC NUMBER buttons

Direct search/Digit buttons

DISP button

CHP/TIME button

AUDIO button

D/A/CX button

HILITE/INTRO button

RANDOM button

SKIP buttons

PAUSE button

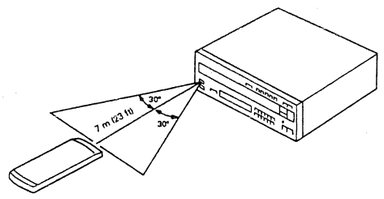
PLAY/SEARCH button

CLEAR button
Used to clear the repeat mode, program mode, random play mode or hi-lite scan/intro scan mode. This button is also for use in correcting input digits.

PGM button

REPEAT button

When operating the remote control unit, point the unit's infrared signal transmitter at the remote control receiver (REMOTE SENSOR) on the front panel of the player. The remote control unit can be used within a range of about 7 meters (23 feet) from the remote sensor, and within angles of up to about 30 degrees.



NOTE FOR USING THE REMOTE CONTROL UNIT

- *If a plug is connected to the CONTROL IN terminal at the rear of the player, remote control operations cannot be done with the remote control unit aimed at the player's remote control sensor. Aim the remote control unit at the AV control center or the component display's sensor instead.*
- *If there is any obstacle between the remote control unit and the player, or if the unit is held at too large an angle relative to the front panel of the player, the signal from the remote control unit will fail to reach the remote sensor.*
- *If the player is operating in the vicinity of other appliances generating infrared rays, or if other remote control devices using infrared rays are used near the player, the player may operate improperly. Conversely, if the player's remote control unit is operated in the vicinity of other appliances which use an infrared remote control device, the other appliance may operate improperly. If this should happen, change the place of installation so that improper operation does not occur.*
- *If the range of operation of the remote control unit becomes too short, replace the batteries.*
- *When the unit is not to be used for a long period of time (more than one month), remove the batteries to prevent them from leaking inside the compartment. If leakage occurs, wipe up the liquid inside the compartment and replace the batteries with new ones.*
- *Do not place books or other objects on the remote control unit, since they might depress the buttons and run down the batteries.*
- *If the remote control sensor window is in a position where it receives strong light such as sunlight or fluorescent light, control may not be possible.*

12. SPECIFICATIONS

1. General

System ..... LaserVision Disc system and Compact Disc digital audio system
Laser ..... Semiconductor laser wavelength 780 nm
Power requirements
U.S. and Canadian models ..... AC 120V, 60 Hz
Multi voltage model ..... AC 110V/120-127V/220V/240V (Switchable), 50/60 Hz
Power consumption ..... 39 W
Weight ..... 9.5 kg (20 lbs 15 oz)
Dimensions ..... 420 (W) x 450 (D) x 142 (H) mm
16-9/16 (W) x 17-11/16 (D) x 5-9/16 (H) in
Operating temperature ..... +5°C ~ +35°C (41°F - 95°F)
Operating humidity ..... 5% ~ 90%
(There should be no condensation of moisture.)

2. Disc

LaserVision Discs

*Maximum playing times
12-inch standard play disc ..... 1 hour/both sides
12-inch extended play disc ..... 2 hours/both sides
8-inch standard play disc ..... 28 min/both sides
14 min/one side
8-inch extended play disc ..... 40 min/both sides
20 min/one side
Spindle motor speed
Standard play disc ..... 1,800 rpm
Extended play disc ..... 1,800 rpm (inner circumference) to 600 rpm (outer circumference)
(For a 12-inch disc)

Compact Discs

DISC ..... Diameter: 5-inch, 3-inch, Thickness: 1.2 mm
Rotation direction (pickup side) ..... Counterclockwise
Liner speed ..... 1.2 ~ 1.4m/sec
*Maximum playing time
74 min. 5-inch discs
20 min. 3-inch discs
(For stereo playback)

Compact Discs with Video

Disc ..... Diameter: 5-inch, Thickness: 1.2 mm
Rotation direction (pickup side) ..... Counterclockwise
Linear speed ..... Audio portion: 1.2 ~ 1.4m/sec
Video portion: 11 ~ 12m/sec
*Maximum playing time ..... Video portion: 5 min. (CLV)
Audio portion: 20 min. (Digital)

** Actual playback time differs for each disc.*

3. Video characteristics (two pairs)

Format ..... NTSC specifications
Video output
Level ..... 1 Vp-p nominal, sync. negative, terminated
Impedance ..... 75Ω unbalanced
Jack ..... RCA jack

4. Audio characteristics (two pairs)

Output level
During analog audio output ..... 200 mVrms (1 kHz, 40%)
During digital audio output ..... 200 mVrms (1 kHz, -20 dB)
Jacks ..... Both RCA jacks
Number of channels 2

Digital Audio Characteristics

Frequency response	4 Hz - 20 kHz (±0.3 dB) (EIAJ)
SN ratio	112 dB (EIAJ)
Dynamic range	99 dB (EIAJ)
Channel separation	105 dB (EIAJ)
Total harmonic distortion	0.0019% (EIAJ)
Wow and flutter	Limit of measurement (EIAJ)

5. Other Terminals

Control input/output ..... Both miniature jacks
CD-DECK synchro ..... Miniature jack
VHF adapter output (Video/Audio) ..... Both RCA jacks with DC jack

6. Accessories

Remote control unit (CU-CLD051) 1
Size "AAA" (IEC R03) dry cell batteries 2
Video cord 1
Audio cord 1
Operating instructions 1
Warranty card 1

7. Functions

Remote control unit operations (CU-CLD051)

	Function	Standard play Disc (CAV)	Extended play Disc (CLV)	Compact Disc with Video	Compact Disc
Basic Functions	Single-side play	YES	YES	YES	YES
	Pause	YES	YES	YES	YES
	Stop	YES	YES	YES	YES
Search	Fast forward (forward and reverse)	YES	YES	YES	YES
	Chapter/Track skip	YES	YES	YES	YES
	Direct chapter/Track number search	YES	YES	YES	YES
	Frame number search	YES	NO	NO	NO
	Time number search	NO	YES	YES	YES
	Absolute time search	NO	NO	NO	YES
	Disc search	NO	NO	YES	YES
Program	Chapter/Track program play	YES	YES	YES	YES
	Program correction	YES	YES	YES	YES
Repeat	Chapter/Track repeat	YES	YES	YES	YES
	One-side repeat	YES	YES	YES	YES
	All-disc repeat	NO	NO	YES	YES
	Program repeat	YES	YES	YES	YES
	Random repeat	YES*1	YES*1	YES	YES
	Program random repeat	YES	YES	YES	YES
Trick play	Still/Step	YES	NO	NO	NO
Time display	Elapsed time display	NO	YES	YES	YES
	Absolute time display	YES*1	NO	NO	YES
	Remaining track time display	NO	NO	YES	YES
	Remaining total time display	YES*1	YES*1	YES	YES
	Total number of selections, total time display	YES*1	YES*1	YES	YES
Others	Hi-Lite scan	NO	NO	YES*4	YES
	Intro scan	YES	YES	YES*5	NO
	CX system ON/OFF	YES*2	YES*2	NO	NO
	AUTO DIGITAL/ANALOG switch	YES*3	YES*3	NO	NO
	Audio channel selection (Stereo, 1/L, 2/R)	YES	YES	YES	YES

*1 Only discs with TOC

*2 Valid for analog sound playing a disc with the CX mark.

*3 Can only be used with discs with digital sound tracks.

*4 Audio part only

*5 Video part only

NOTE:

The specifications and design of this product are subject to change without notice, due to improvement.

PLAYER FUNCTIONS

- Display, Visual Calendar Display
- Intro Scan, Hi-Lite Scan, Direct CD, ADLC, Random Playback, Disc Random Playback, Program Random Playback and Compu Program/Auto Program Edit
- Digital Sound for LaserVision Discs
- Last Memory